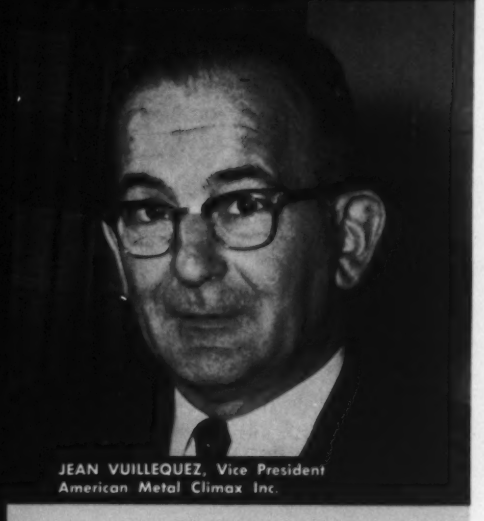
CHARLES INCE, Vice President—Sales
St. Joseph Lead Co.

SIMON D. STRAUSS, Vice President—Sales
American Smelting & Refining Co.



JEAN VUILLEQUEZ, Vice President
American Metal Climax Inc.

These lead and zinc executives are helping their companies inject new vigor into an old industry. Research and development are opening new Space Age markets, expanding old ones. Check the trends—Page 63

STEEL

The

Metalworking Weekly

APRIL 25, 1960

A PENTON PUBLICATION

Are Incentives Becoming Obsolete?

High Energy Forming—Pick The Right Technique for the Job

Double Carbide Material Triples Cutting Speed of New Saw Blade

Gray Iron Founders Predict Sales Improvement, But No Boom

CONTENTS—TURN PAGE

How B&W JOB-MATCHED TUBES save money on parts subject to corrosion

With B&W Job-Matched Stainless Steel Mechanical Tubing you get:

- . . . a choice from a wide range of stainless steels to best fit most combinations of service and fabricating requirements
- . . . a full range of diameters and wall thicknesses in various surface finishes—to reduce machining time, and simplify forming operations
- . . . consistent dimensional accuracy—which cuts forming and machining time.

This means you can simplify fabricating procedures, cut production costs and turn out a better product with B&W Tubes matched to the job.

For complete information about B&W Job-Matched Stainless Steel Mechanical Tubing call the local B&W District Sales Office or write for Bulletin TB-365. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

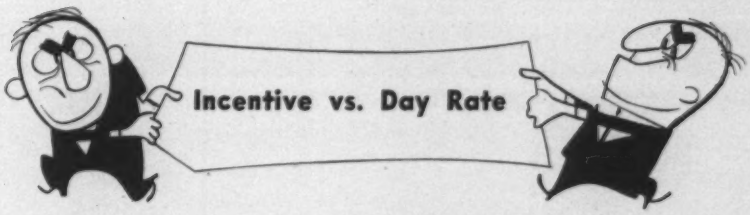
TA-9006-S1

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

The Metalworking Weekly

April 25, 1960 Vol. 146 No. 17



STEEL posed the question: Are incentives becoming obsolete? We got "Yes" and "No" answers. Supporters of both incentive and measured day rate programs rose to defend their approaches to improving worker performance. But both sides concur: The success of either approach hinges on ten key management factors involving control and administration. PAGE 66

Pasteup Drafting Cuts Engineering Time

Draftsmen at Ledex Inc., Dayton, Ohio, don't waste time redrawing standard pictorial segments for original drawings. By pasting up preprinted segments and making composite photographs, they've cut drafting time as much as 90 per cent. PAGE 76

High Energy Forming—Pick the Right Technique

Here's the latest word on four processes you'll be hearing more and more about: Explosive, hydroelectric, and pneumatic-mechanical forming and closed cavity extrusion molding. STEEL's progress report tells you how the new techniques work, evaluates their strengths and weaknesses, and explains their current uses. "Each method of high energy rate forming has its own area of application," says E. W. Feddersen of General Dynamics Corp.'s Convair Div., Ft. Worth, Tex. The Space Age processes offer engineers new freedom from design and tooling limitations. PAGE 108

Double Carbide Material Triples Sawing Speed

Double carbide bandsaw blades promise to reduce costs and multiply cutoff speeds. The material, developed by a leading alloy producer, is said to have the right hot hardness and abrasion resistance for economical sawing. In tests, the blades cut several types and sizes of steel three times faster than a conventional blade. PAGE 127

Gray Iron Founders Predict Sales Rise But No Boom

Shipments of gray iron castings this year will top 1959's by about 5 per cent, the best year since 1956. Commercial shops are working a 40 hour week, but slim backlogs could cause a cutback if orders go into a prolonged decline. Labor costs are climbing in line with the steel industry pattern and will force a price rise by yearend, say the founders. PAGE 137

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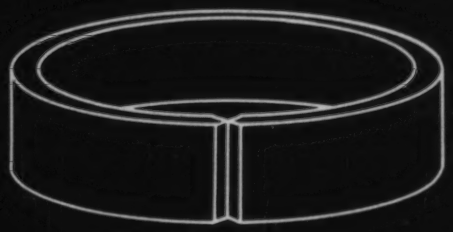
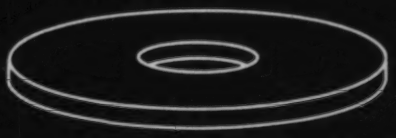
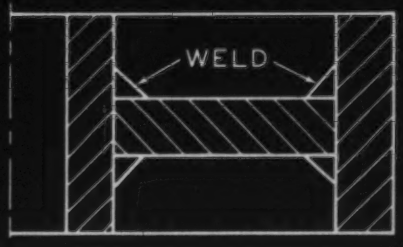


FABRICATED RING



WEB BURNED FROM PLATE

HUB CUT FROM BAR STOCK



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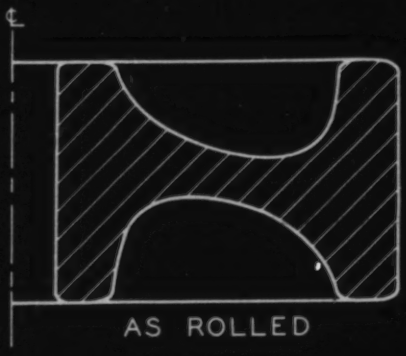

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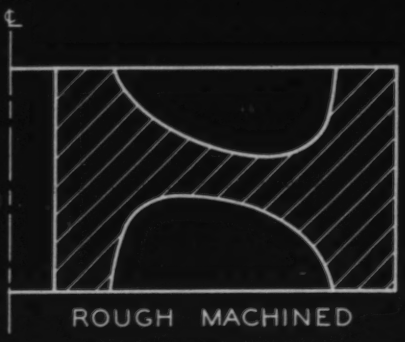


ROUGH MACHINED

Why fabricate it?

(and pay for waste metal, assembly time, welding?)

Bethlehem Circular Forgings come ready for finish machining. Unlike a weldment, there's no fabricating to be done. No assembling. No welding. You save the high cost of all those operations—and the cost of the metal those operations waste.

Cost? Thanks to our Slick Mill (the only one of its kind in the country), the cost of Bethlehem Circular Forgings is low. Even if new tooling is required, orders of 20 or more pieces are economical (dies can be changed in just 15 minutes). Our mill forges and rolls an impression-die forging in about one minute. Because contact time between die and work is so brief, and because there's no impacting, low-cost dies can be used.

We'll forge it!

(and cut your costs: less metal, no assembly or welding)

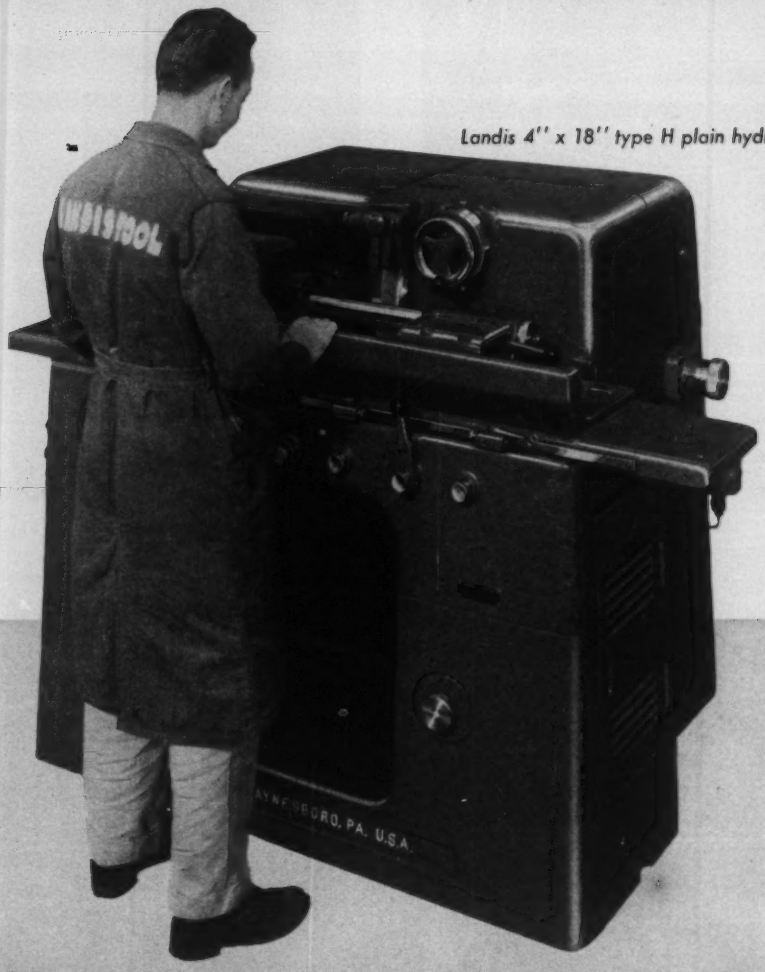
There you have it. One, important fabrication savings. Two, low initial price. That's why forged circular products consistently cost less than weldments.

Bethlehem Circular Forgings are available in carbon, alloy, or stainless steels, and some heat-resistant grades. 10 to 48-in. OD. 100 to 2,000 lb. As-rolled or rough-machined to specifications. For full details, call or write the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

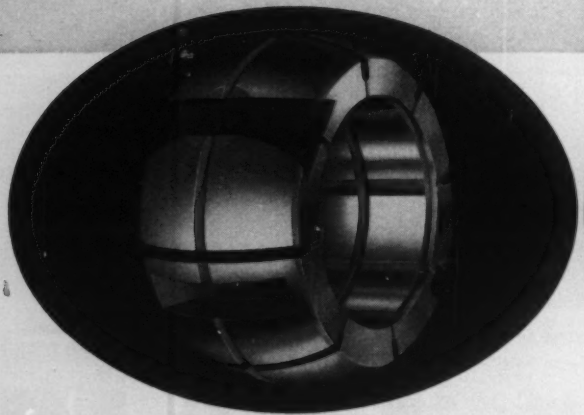


Landis 4" x 18" type H plain hydraulic grinder

Production and precision of 4" Landis hydraulic grinder give lower cost per unit

condensed specifications

Nominal work swing	4"
Length between centers	18"
Diameter grinding wheel	16"
Wheel drive motor	3 hp.
Work speed range (rpm)	200-900
Net weight	4400 lbs.



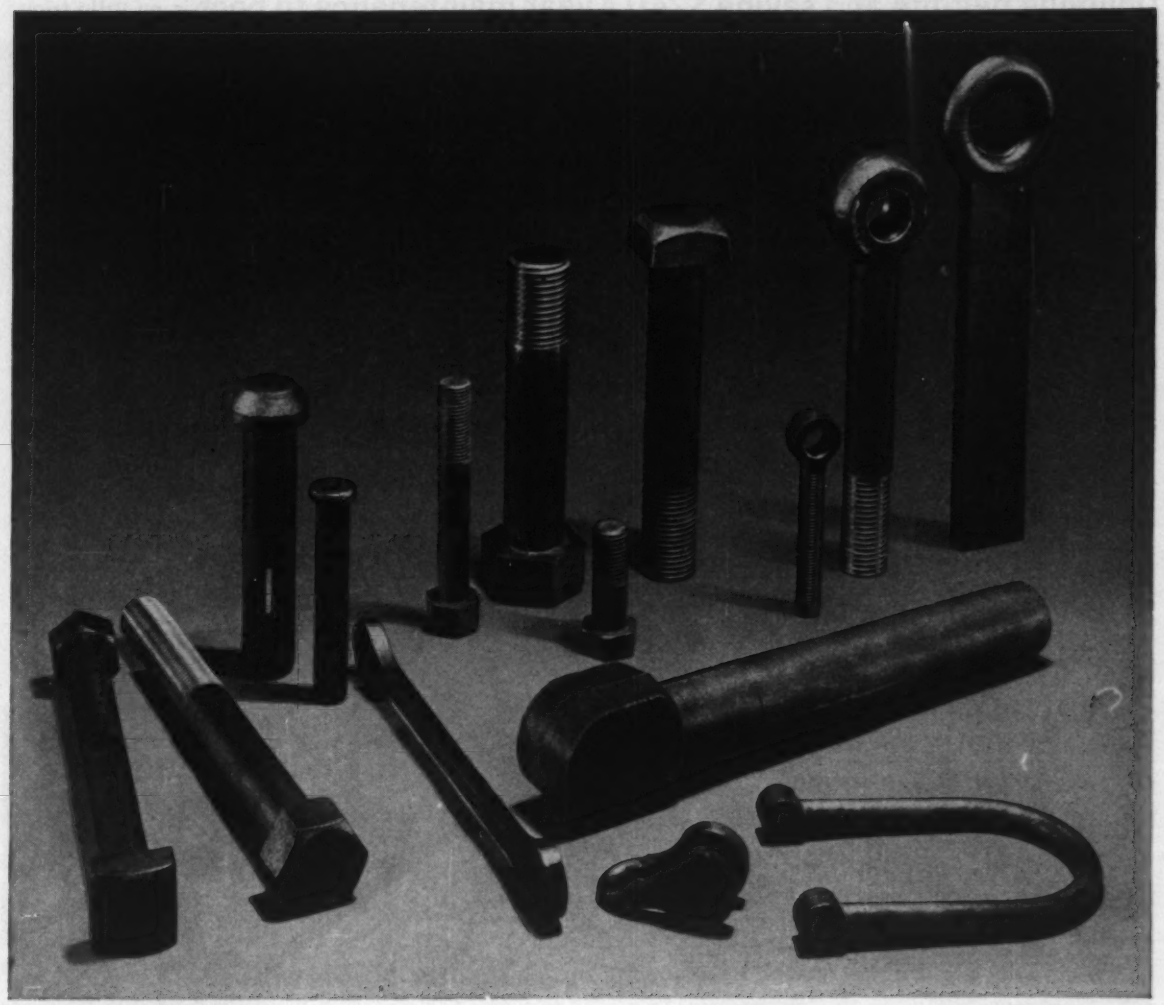
Exclusive Landis Microsphere wheel spindle bearings . . . with closest running clearance of any spindle bearings, for added precision and shorter spark-out time.

LANDIS

precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

MMT PE



Your special fastener can be right here.
If you don't see it, COMMERCIAL will make it.

How to Get More For Your Fastener Dollar

We upset and head bar stock—round, square, hexagon or flat—sections ½ in. to 6½ in., lengths 3 in. to 40 ft. In fact, we have made fasteners weighing over a ton apiece which were over 33 ft. long. We have production machines to form eyes, pierce holes, bend shapes. COMMERCIAL can cut threads up to a diameter of 6½ in. and produce continuously threaded rods to lengths of 20 ft.

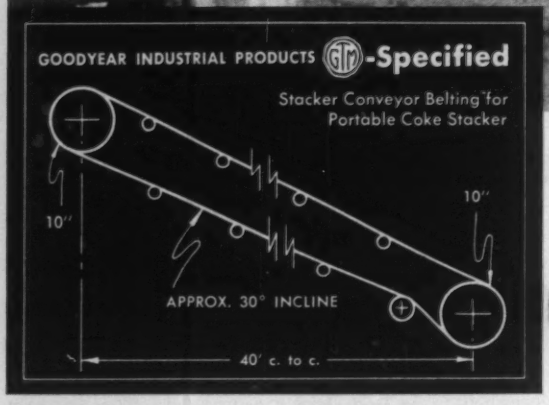
■ **Large stocks** of raw materials are in good supply—a head start for your assurance of fast delivery. We're for fast service.

■ **Just send** a print or sketch of the part to Commercial Shearing & Stamping Company, Dept. L-18, Youngstown 1, Ohio.

Specialists in the shape of things to come
CUSTOM STAMPING • UPSET FORGING • ROTOFORMING

COMMERCIAL
shearing & stamping

Doubling belt-life and saving $240 a year maintenance to boot is no little trick. So this big Midwestern foundry gave their vote of thanks to the G.T.M.—Goodyear Technical Man. For it was his recommendation of Stacker Conveyor Belting that ended once-every-year replacements on their portable coke stacker. And remember, that 2-year-plus service from the G.T.M.'s belt was in the face of high speed, high impact, high abrasion operation—plus constant exposure to the weather.



The tougher the operation — and the rougher it's been on any type industrial rubber — the wiser it is to call in the G.T.M.

You can contact the G.T.M. simply by checking with your Goodyear Distributor. That's also your source for the longest-lasting Hose, V-Belts and other industrial products. Just look under "Rubber Goods" or "Rubber Products" in the Yellow Pages — or write Goodyear, Industrial Products Division, Akron 16, Ohio.

lots of good things come from

GOODYEAR

THE GREATEST NAME IN RUBBER

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

April 25, 1960

Here's Ernest J. Hills, Winner of STEEL's February Usership Contest

After receiving STEEL's check for $500 and a Usership plaque, Mr. Hills (left) chats about his entry with Associate Managing Editor John Morgan

Mr. Hills is a senior engineer in the Methods and Process Laboratory, Power Tube Engineering, Electron Tube Div., Radio Corp. of America, Lancaster, Pa. He won the $500 Usership award in our February contest by using information about superalloy spring wires. His idea: A quality improvement in one of RCA's 150 lb superpower electron tubes—but let him tell the story. . .

Here's His Entry

"As you will see, it was only natural that I wanted to find out more about the highly special spring alloys which were advertised by no less than three companies in the Feb. 15 issue of STEEL.

"We have a real cost problem here. Our 'Super Power Tubes'—world's largest—for long distance radar and missile work, must be baked out at 350 to 400° C (662 to 752° F) for 8 hours in a vacuum of 10^{-7} mm of mercury. Inside are 96 filament coil springs, stressed to 161,000 psi.

"We now use 18-4-1 special high speed steel 0.020 diameter, centerless ground to remove surface decarburization caused by hot working. Besides being frightfully expensive, this grinding produces millions of microscopically small notches which induce stress concentrations.

"Complex hardening, tempering, hot setting, cold setting processes, all in special setups, many in special atmospheres or vacuums, plus high scrap, rejects, etc., bring the cost of each of these tiny parts to over $5; almost as much as their weight in gold.

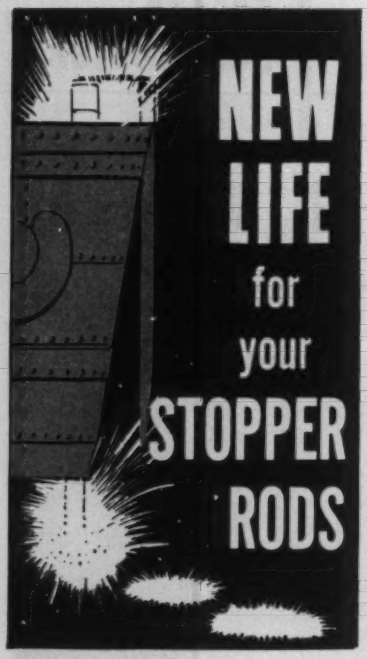
"Acting fast, I have already received replies and data from all three advertisers. Sandvik Steel's sales engineer, James J. Martin, followed up at once with a personal call here at RCA and told me he is confident an alloy for the purpose can be developed and produced for us. He wants specs for the spring which he will get.

"National Standard's NS-25 looks good also. I am working feverishly to accelerate this development program. Our engineering manager, Dr. B. B. Brown, saw the article on superalloy springs (STEEL, Feb. 22, pp. 68-69) and asked me if I had seen it."

Mr. Hills certainly had seen the article. It and the three advertisements earned him $500. A tidy sum when you figure it at the rate of $1.86 per word for 269 words.

Honorable Mention Winners . . .

. . . Ten of them, received desk lighters as testimonials to the sound thinking which they put into their entries. Here are their names in ABC order: R. H. Bliss, vice president, Bliss Steel Products Corp., East Syracuse, N. Y.; R. A. Butler, plant engineer, Titusville Iron Works Div., Struthers Wells Corp., Titusville, Pa.: Stanley Emery, aircraft engineer, Mfg. & Repair Div., Westinghouse Electric Corp., Compton, Calif.; J. C. Hubeny, general manager, Hubeny Bros.



with . . .

MORT-AIRSET

STOPPER ROD CEMENT

Try this performance-proved refractory product. Note its high moisture retention and smooth working qualities and the fact that it does not ball or gum up in the drum, but is always in usable condition. Observe its stronger, tighter bond . . . desirable qualities that result in longer service life, not only on stopper rods but wherever stronger, gas-tight joints are required.

WALSH
REFRACTORIES
CORPORATION

101 FERRY ST. · ST. LOUIS 7, MO.

FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

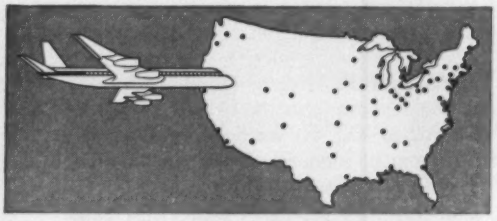
Inc., Roselle, N. J.; Forest S. Major, plant manager, Steel Products Div., Burnham Corp., Lancaster, Pa.; Kenneth L. Merrick, executive vice president, Indiana Wire & Specialty Co. Inc., Indianapolis; V. Przygocki, chief engineer, Murray Way Corp., Birmingham, Mich.; Joe E. Roberson, General Offices, Reynolds Metals Co., Richmond, Va.; Alfred R. Roth, partner, A AN E Mfg. Co., Chicago; and Albert C. Russell, supervisor, Standards Dept., Halliburton Oil Well Cementing Co., Duncan, Okla.

Here's How You Can Enter

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—April, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

You will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

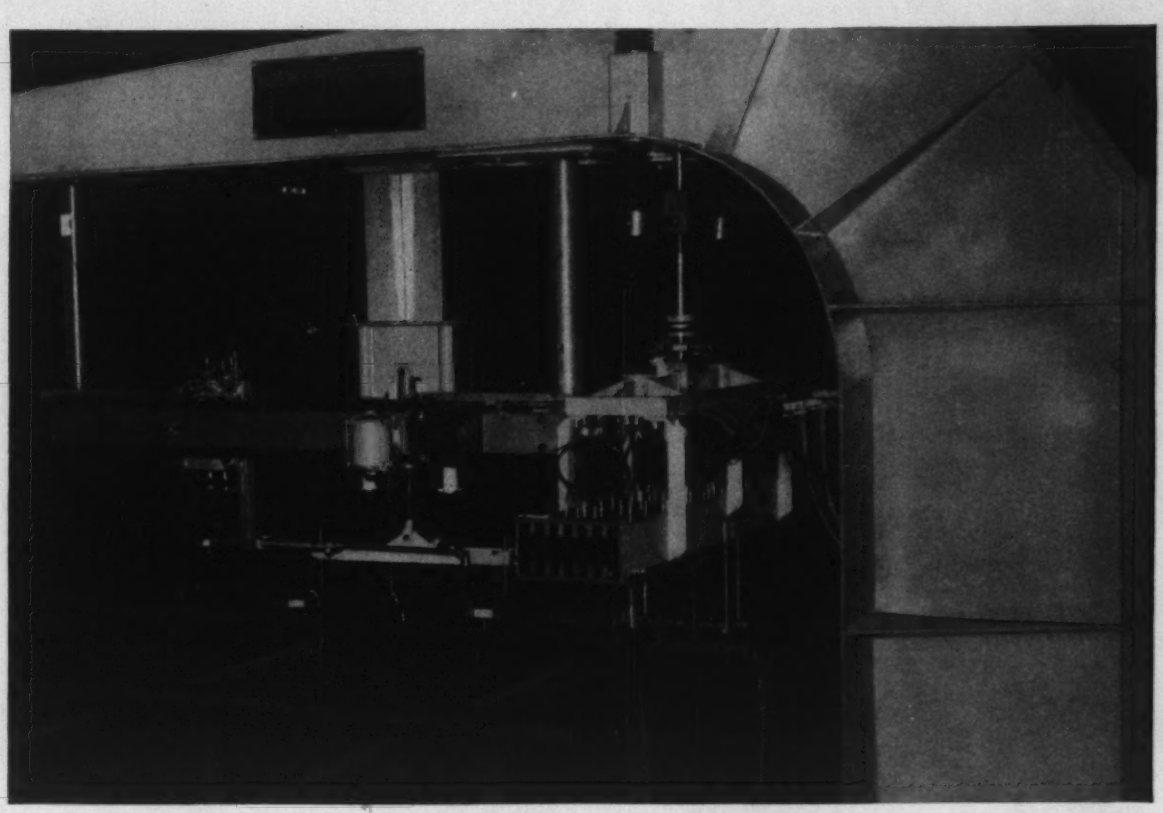
You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is June 1, 1960.



Coast-to-Coast Air Safari

A team of STEEL's editors is jetting across the country to check the business pulse with hundreds of metalworking and other industrial executives.

The editors are looking for reasons behind the flagging optimism that became apparent after New Year's Day. They are recording impressions, opinions, and attitudes concerning current business levels. During the coast-to-coast safari, they're hitting about 30 cities and interviewing industrialists wherever they find them: Air terminals, trade shows, offices, plants, or taxicabs. The feature starts next week and will run for three subsequent weeks. It's designed to give you an up to the minute report on what's happening in business.



Loewy-built automatic pipe counting, measuring, weighing, stenciling and recording machine in operation.

Now! Loewy brings AUTOMATION to steel pipe data processing!

Until very recently, steel pipe data processing demanded large crews, costly training, strict coordination, continuous supervision.

The new Loewy system, however, handles the many steps involved *automatically:*

- Weighs each pipe by means of B-L-H load cells.
- Measures pipe length.
- Stencils these variables on each pipe, in addition to fixed data, in conformance with A.P.I. standards.
- Computes weight per foot for each pipe.
- Rejects pipes out of weight tolerance.
- Indicates and prints the cumulative number of pipes, the individual and cumulative total lengths and weights, the time, the date, and pre-set data for each pipe.

Electromechanical instrumentation provides visual readouts, signals at values of count, total or individual weight or length, upper and lower limit of tolerance, or any other measured or calculated quantity. These signals may be used to operate relays, alarms, reject devices, to close down the line, to position cut-off devices, or whatever is required. And all this is done as an integral part of the mill production line.

Two of these Loewy robots are already in successful operation at a leading Midwestern steel mill, each handling 7 miles of heavy steel pipe in one 8-hour shift with ease. A third is now on order.

Close-up view of variable message stenciling section.

Loewy data gathering and processing equipment is not limited to tubular products. It can be used in any process which involves linear measurement, weighing, calculated quantities depending on these measured variables, automatic error-proof stenciling and printing of tally sheets, shipping information, inventories, production and incentive records, card or tape punching.

We shall be glad to explore the usefulness of Loewy pipe processing equipment for your plant. Write Dept. B-4.

BALDWIN · LIMA · HAMILTON

INDUSTRIAL EQUIPMENT DIVISION • PHILADELPHIA 42, PA.

Somewhere North of Baffin Bay

The Arctic is almost as silent and lifeless as an ice-cube. But, deep inside it, these 400-foot long missile-detection antennas will guard the life of our country.

They're part of a Ballistic Missile Early Warning System (BMEWS). Officially, you'd call them surveillance radar antennas. Yet, they look like over-sized baseball mitts. That web-like framework can detect (or spot) a far-off missile darting through the shivering Arctic sky, and rifle its speed and direction to any of our military bases in seconds.

Up here, weather is a constant battle. Arctic storms slam into the 163-foot high antennas, and rake icy fingers back and forth over the mesh-faced structures. But they'll stand for years. The D. S. Kennedy Com-

pany, builders, made certain of that by weaving foot after foot of USS National Seamless Carbon and Nickel Alloy Tubing into every antenna.

For over 90 years, USS National Pipe and Tubes have been used for demanding tubular installations in the fields of line pipe, pressure tubing, mechanical tubing, structural pipe and oil country tubular products. Would you like to benefit from our experience? Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and National are registered trademarks

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

Another H&S Speed Reducer *on a tough job...*

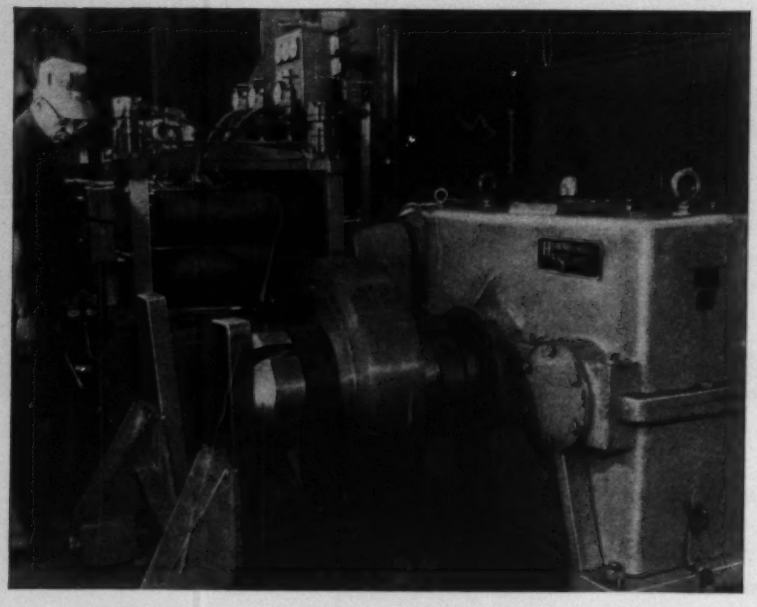
Built rugged for a critical rewind operation, this heavy overhung-load type H & S Herringbone Speed Reducer delivers day-in-day-out service under exacting load conditions.

This standard unit was selected for use on a Bliss precision rewind coiling machine—where strip steel must undergo tension controlled recoiling for subsequent annealing treatment.

Notice the sturdy shaft, with heavy-duty bearings designed to take this heavy overhung load. Observe the rugged housing, made to last.

This built-in toughness typifies H & S construction—on helical, herringbone, worm and combination units.

Send for detailed information on our facilities for producing a complete line of gears and speed reducers in a wide range of sizes and ratings.



Heavily loaded pay-off reel being driven by H & S Speed Reducer in plant of The Acme Steel Company, Chicago.

H&S **The HORSBURGH & SCOTT CO.**

5112 Hamilton Avenue • Cleveland 14, Ohio

Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

CALENDAR OF MEETINGS

Apr. 25-26, American Society of Mechanical Engineers: National Maintenance & Plant Engineering Conference, Chase-Park Plaza Hotel, St. Louis. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Apr. 25-27, Association of Iron & Steel Engineers: Spring conference, Sheraton Hotel, Philadelphia. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 25-29, American Welding Society: Annual meeting and welding exhibition, Biltmore Hotel and Great Western Exhibit Center, Los Angeles. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Apr. 26-29, Copper & Brass Research Association: Annual meeting. Emerald Beach Hotel, Nassau, Bahamas. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

May 1-4, Chamber of Commerce of the U. S.: Annual meeting, Constitution Hall, Washington. Chamber's address: 1615 H St. N.W., Washington 6, D. C. Executive vice president: Arch N. Booth.

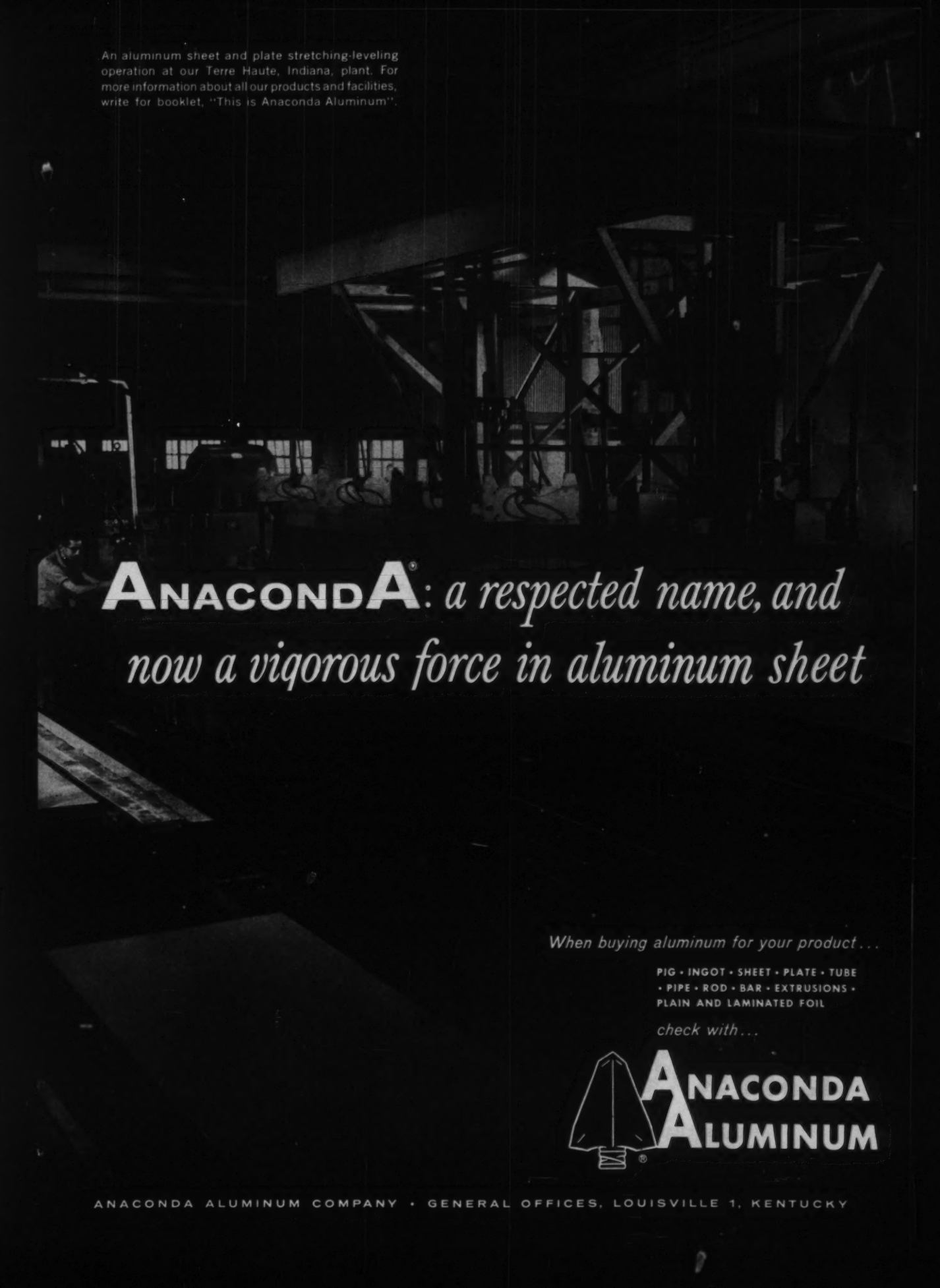
May 1-4, Liquefied Petroleum Gas Association Inc.: Annual meeting, Conrad Hilton Hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 3, Ill. Secretary: Arthur C. Kreutzer.

May 1-5, Electrochemical Society Inc.: Annual meeting, LaSalle Hotel, Chicago. Society's address: 1860 Broadway, New York 23, N. Y. Executive secretary: Robert K. Shannon.

May 1-7, National Association of Architectural Metal Manufacturers: Annual convention, Boca Raton Hotel & Club, Boca Raton, Fla. Association's address: 228 N. LaSalle St., Chicago 1, Ill. Executive secretary: W. N. Wilson.

May 5-6, American Institute of Steel Construction: National engineering conference, Brown-Palace Hotel, Denver. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

May 5-6, Refractories Institute: Semi-annual meeting, Homestead Hotel, Hot Springs, Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary. Avery C. Newton.



An aluminum sheet and plate stretching-leveling operation at our Terre Haute, Indiana, plant. For more information about all our products and facilities, write for booklet, "This is Anaconda Aluminum".

ANACONDA®: *a respected name, and now a vigorous force in aluminum sheet*

When buying aluminum for your product...

PIG • INGOT • SHEET • PLATE • TUBE • PIPE • ROD • BAR • EXTRUSIONS • PLAIN AND LAMINATED FOIL

check with...

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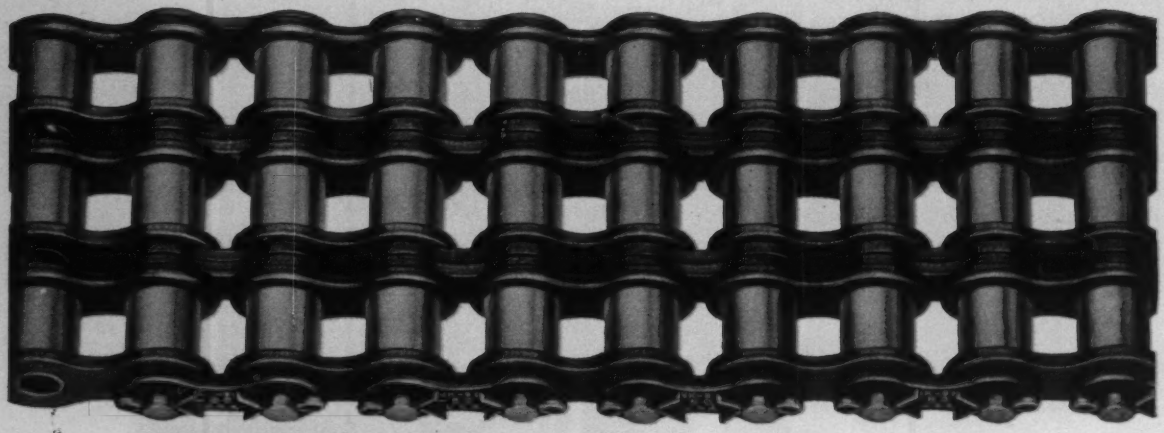
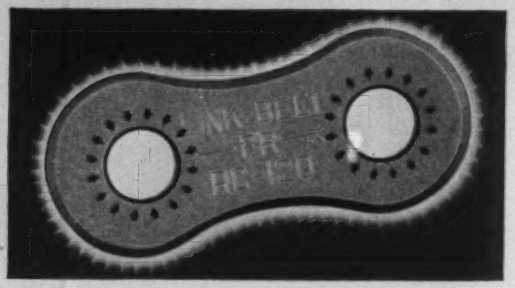
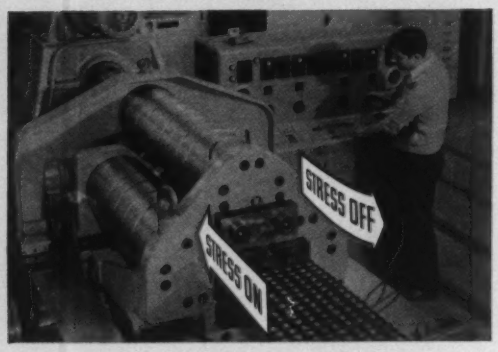




Arrows indicate critical areas treated with compressive stresses to improve fatigue resistance.

Fortified against fatigue



65 TONS OF CYCLIC TENSION! With this equipment—largest of its kind known to be in operation in roller chain testing—Link-Belt tests and rates roller chains. Rapid "stress-on, stress-off" action duplicates operating conditions at a greatly accelerated pace . . . proving over and over that Link-Belt chains are fortified against fatigue.

Link-Belt offers special FR® processed roller chain for applications involving repeated high-tensile loads

Jobs too rugged for standard roller chains are taken in stride by Link-Belt FR roller chain. Through its patented FR process, Link-Belt gives *greater dynamic strength* to the larger sizes of chain most likely to encounter severe cyclic loading. FR greatly raises the chain's endurance limit by compressing metal around pitch holes—the critical sidebar areas most vulnerable to fatigue failure.

The FR process results from the same design and metallurgical research that has produced many more "extras", all *standard* in Link-Belt roller chains. They include shot-peened rollers, close heat-treat control, lock-type bushings and others. For further details on Link-Belt roller chains, send for Book 2657.

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ROLLER CHAINS AND SPROCKETS

BOOK 2657 has 154 pages of roller chain data. For your copy, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

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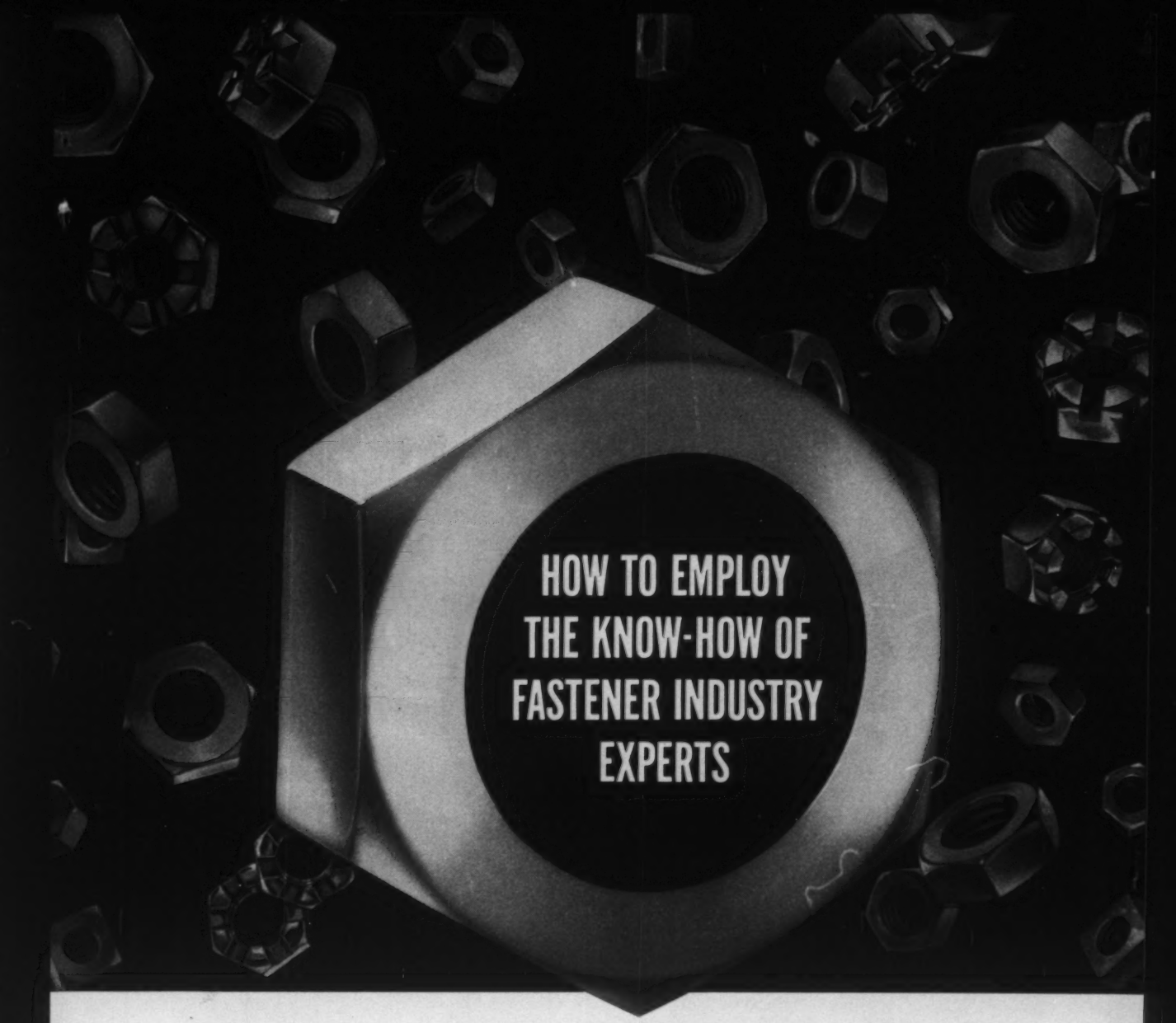

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REPUBLIC Bolts and Nuts

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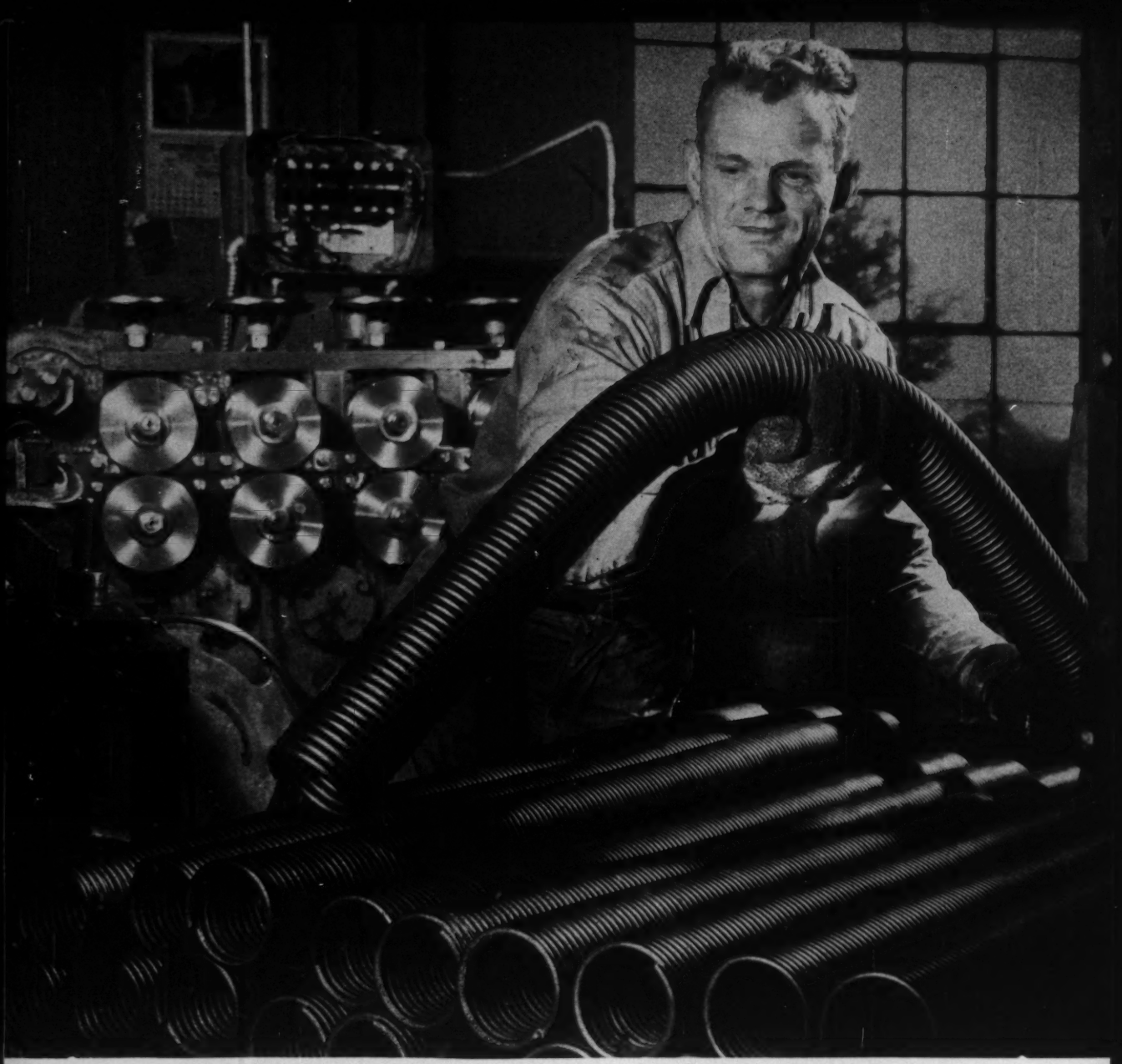

Torsion springs for Crawford Door Co.'s Marvel-Lift garage doors are coiled from Pittsburgh Steel Co.'s Oil Tempered MB Wire, from wire .168 inch to .468 inch in diameter.

How Pittsburgh Steel's Wire Makes . . .

Springs That 'Rate'

Crawford Door Co. Depends on Uniformity of Pittsburgh Steel Wire For Precise Engineering of Marvel-Lift Garage, Industrial Doors

Torsion springs which operate Crawford Door Company's garage and industrial doors have to "rate." Here, rate means the force stored up in the spring to supply power for smooth, efficient, finger-tip raising and lowering.

The rate built into any spring—from a 42½-inch long spring on a single car Marvel-Lift residential garage door to a 12-foot long spring on an industrial door—depends on uniformity of wire diameter.

Lack of uniformity throws off engineering calculations and spoils spring performance. Let Elliott Koepfgen, chief engineer for Crawford Door, explain how uniformity of Oil Tempered MB Wire supplied by Pittsburgh Steel Co. helps him design torsion springs to meet pre-determined rates:

"Each of our springs is made to meet a definite rate. This rate is the

torque which can be exerted in one turn of the spring. It provides the force stored up in the spring to operate the doors. By calculating the diameter of the wire, the number of coils and the number of turns the spring is turned back against itself, we can design a spring with the rate we know is necessary to lift a door of a certain weight and height.

"Uniform diameter is a must since variations would drastically affect spring performance. Uniformity helps us design efficient springs which will last the life of the door. If we overbuild the spring we run up production costs. If we underbuild, we get failures in service and customer dissatisfaction.

"Pittsburgh Steel supplies us Oil Tempered MB Wire we can count on to be so uniform that we can treat wire diameter as a known factor in our engineering calculations."

Oil Tempered MB Wire from Pittsburgh Steel Co.'s wire mills is checked at Crawford Door plant by M. J. Duffy, plant manager, left, and W. D. Williams, Pittsburgh Steel Co. salesman.

Here's how it works in two typical designs: for an eight-foot high, 128-pound door in a single car residential garage, Mr. Koepfgen specified a spring made from .263-inch diameter wire. The wire was coiled into a 14.5-pound spring 42¼ inches long with 160 coils. Because the wire was uniform in diameter, each spring made to these specifications had a rate of 60 when the springs were turned back on themselves 7 turns each.

Or take a large industrial door application. For a specially engineered door 12 feet high and weighing 654 pounds, Mr. Koepfgen specified a spring made of .468 wire. The spring was 78¾ inches long, weighed 234 pounds and had a rate of 271 when the spring was turned back 7¼ turns. Because of uniformity in wire diameter, the spring and door combination worked perfectly after installation.

• **Buys 23 gages**—Crawford Door Co. relies on Pittsburgh Steel Co. for oil tempered wire in 23 gages, ranging from .168 inch in diameter for springs 26 inches long to wire .468 inch in diameter, used to coil springs up to 14 feet long.

Uniformity of diameter isn't the only requirement. Crawford Door also insists upon, and gets from Pittsburgh Steel Co., wire with these qualities:

1. Fatigue strength—Springs must have long life without taking a set since garage doors are expected to last indefinitely even in busy places like gasoline service stations.

2. Coilability—Automatic coiling machines can't operate efficiently or economically unless the wire runs through the coilers smoothly. So Crawford wants a good surface free from defects.

3. Proper Temper—Oil tempering and heat treating at the wire mills of Pittsburgh Steel produce wire free from soft and hard spots so that wire can be coiled without bulges which affect performance and shorten spring life.

Plant Manager M. J. Duffy says Pittsburgh Steel supplies wire in shipment after shipment which "gives consistently good results without slowing production or piling up rejects."

Whatever your requirements for manufacturers' wire, whether you're making bobby pins or springs, you'll benefit from the skill and mill facilities which produce wire tailor-made to this customer's specifications. A mill-trained representative is as close as your telephone to help you solve your wire problems or show you how Pittsburgh Steel Co. wire can help reduce costs while improving your product. Call a Pittsburgh man today in the nearest district office.

Installation on garage door. Spring is turned back on itself the calculated number of times and mounted on tubular shaft running width of door. Cables fastened to drums at each side of shaft raise or lower doors. When door is lowered, door weight winds up spring, storing power to be used in raising the door. Lift is applied to both sides of door so it raises evenly, gliding upward in absolutely level position.

Pittsburgh Steel Company

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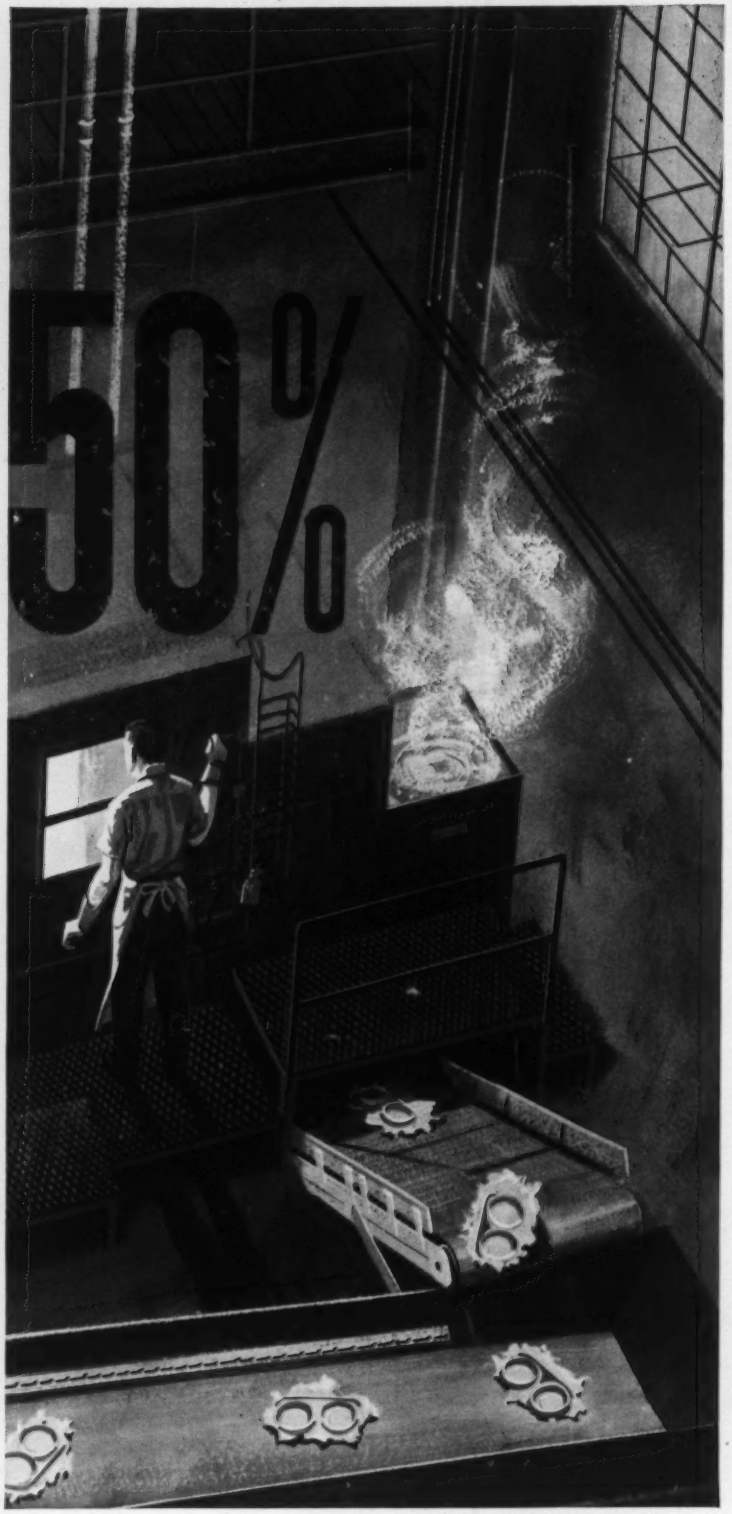
Brown-Lipe-Chapin eliminates manual handling with mechanical ejection of hot die castings.



Here's a typical example of how Brown-Lipe-Chapin engineers put quality into your die cast parts.

After the die casting cycle, castings are ejected automatically into a quench, where a conveyor takes them to the trim press. This modern method of die casting allows a maximum operating rate and boosts the over-all production rate by 50%. Also, casting uniformity is assured because the cycle time is constant and unaffected by operator fatigue or other human factors.

This is just one of the many outstanding features of Brown-Lipe-Chapin die casting facilities that can help make your product better and to more rigid quality standards.

Under the same roof are facilities for metal stamping, anodizing, electroplating, buffing and polishing, precision painting, plus complete engineering service. And two Brown-Lipe-Chapin plants, strategically located in Elyria, Ohio and Syracuse, New York, offer the same complete facilities. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.

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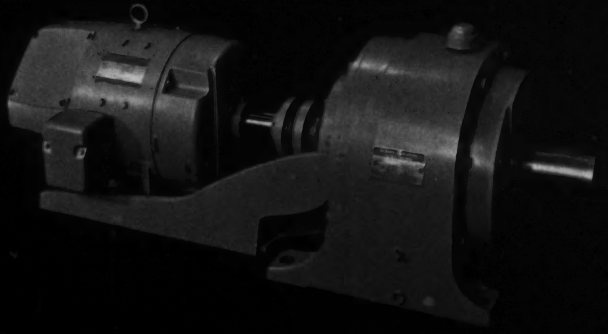


1 HOM, a new alloy developed by Duraloy metallurgists and capable of retaining high working strength at temperatures up to 2200°F, with limited application at 2300°F. The alloy is applicable for all types of castings: static, centrifugal, shell-molded.

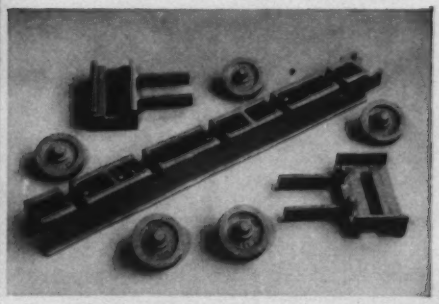
2 Shell-molded castings for meeting close and rigid tolerance limits; post-casting machining or other finishing practically eliminated; low mass production costs.

Illustrating 4 of Duraloy's Major Casting Services

If the casting used in your equipment has to meet high temperature (anything up to 2300°F) and/or corrosion, why not discuss your requirements with our metallurgical staff? Our company can call upon more than 35 years of experience in this exacting business of high alloy castings. In the meanwhile, if you would like to have a copy of our latest catalog, write or call our nearest office.

3 Centrifugal castings which produce a denser, more uniform metal approaching forged metal strength.

4 Static castings which can be produced in weights ranging from a few ounces to single castings 7 tons and heavier; wide range of alloying combinations, including the new HOM referred to above.



Note

As a point of interest, all of the castings shown here were produced for Lindberg Engineering Company, Chicago, for incorporation in heat-treating and annealing equipment sold by that company. The centrifugally cast tube for the generator, trays, and rollers for the furnace rails are cast of HOM. The rails and rail supports for the furnace are statically cast of 35-15 alloy.

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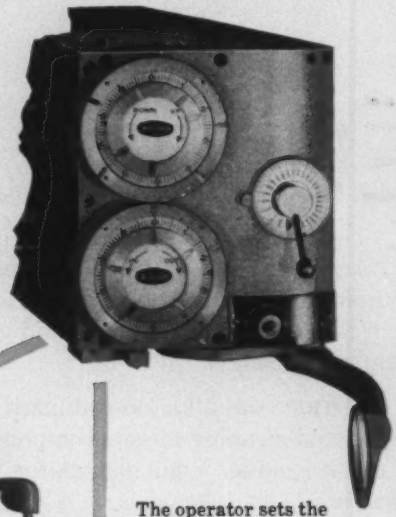
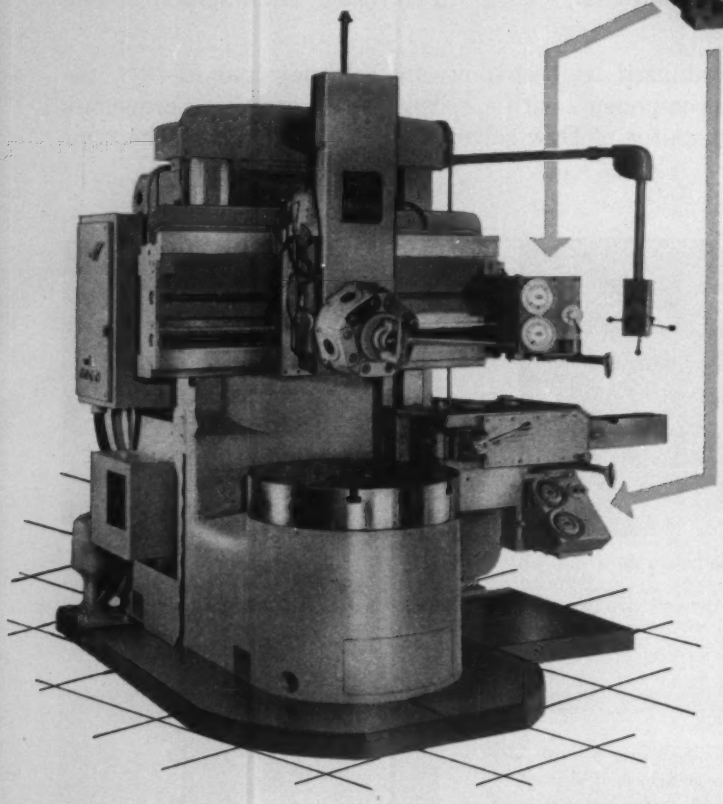
Obsoletes Handwheels

A completely new concept in measuring, utilizes large, easy to read, clock-type dials with dual pointers.





The operator sets the movable clips, around the dial, to conform with the workpiece requirements and by rotating the pointers to these settings he *knows* the tool is precisely located for the operation to be performed. The graduations and numerals remain stationary while the pointers rotate, one registering tenths of an inch and the other thousandths, for exact head positioning.

When coupled with the unique DYNATROL* control, this accurate measuring system eliminates the need for handwheels, for head-positioning, in either feed or traverse and increases the productive time of the machine.

* Trade Mark

Ask your Bullard Sales Representative about the many other features which make the Bullard DYNATROL* the *first* fully power-controlled vertical turret lathe.

THE BULLARD COMPANY, Bridgeport 9, Connecticut.

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By lever or pendant—it's your choice—head traverse rates can be varied from zero to nine feet per minute. Easy-to-read dials show exact position.

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Bullard variable speed drive for infinitely variable table speeds throughout the full range with no loss of usable horsepower.

Fully automatic operation by Bullard Man-Au-Trol or point-to-point or continuous path numerical control systems.

Unique Size-Au-Trol* for accurate positioning of all heads. Contouring attachments: Hydraulic, electronic or electro-hydraulic. Four- or five-sided power-indexing turret heads. Thread cutting, drum scoring and angle turning attachment. Power-operated chucks.

Dynatrol V.T.L. is COMPACT

The new Bullard Dynatrol V.T.L. is compact in design, rigid in construction, lower in height, reduced in floor area.

Dynatrol V.T.L. is EASY TO MAINTAIN

Automatic lubrication throughout... fewer parts... fewer adjustments... easily accessible.

"YOU CAN'T BEAT A BULLARD"

New from Wright!

Built-In Overload Protection for Operator, Load and Hoist with the New Wright Overload Cutoff*!

• Now, for the first time on any electric hoist, you can have safe, sure mechanical overload protection as a built-in feature with the **WRIGHT Overload Cutoff.** Designed and built to fit any new WRIGHT *Speedway* Electric Hoist, the Overload Cutoff unit you see pictured above is a compact, integral part of the hoist frame itself. As a result, it becomes a functional part of the hoist *at no sacrifice in headroom*. The WRIGHT Overload Cutoff is simple in design and should give dependable, trouble-free operation during the entire life of the hoist under normal operating conditions. Calibrated and sealed at the factory for the user's protection, the unit takes rugged abuse up to the critical point of overload—then instantaneously "breaks" the raising circuit of the hoist. This allows the load to be safely lowered to the floor and unhooked. Once this is done, the raising circuit of the hoist is again automatically restored.

The WRIGHT Overload Cutoff is available now as standard equipment on all new WRIGHT Frame 2 & 3 *Speedway* Electric Hoists, and as optional equipment on new Frame 1 & 1½ models.

Find out how WRIGHT *Speedway* Hoists equipped with Overload Cutoff can bring practical, fast-acting overload protection to your material handling operations. For complete information, write our York, Pa., office.

*Patent applied for

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

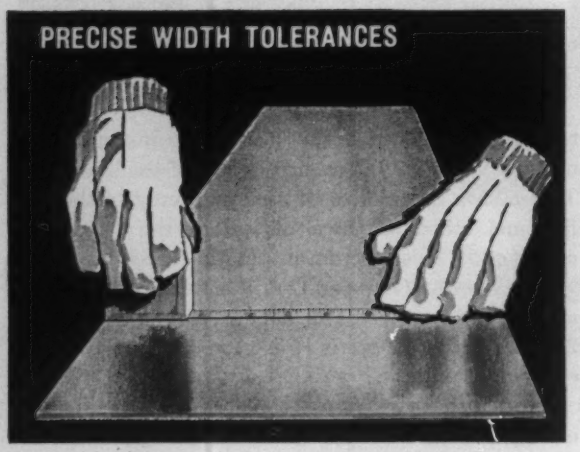
ACCO

Where precision is important...

use USS Amerstrip, the "quality-

USS Amerstrip is a specialty product, rolled in quantities that permits production on precision machines, tailored to the customer's product specifications. When you use USS Amerstrip you get seven important "quality controls" not obtainable with other manufacturing methods.

The finish you get on your Amerstrip order has been specially prepared to meet *your* product's needs.



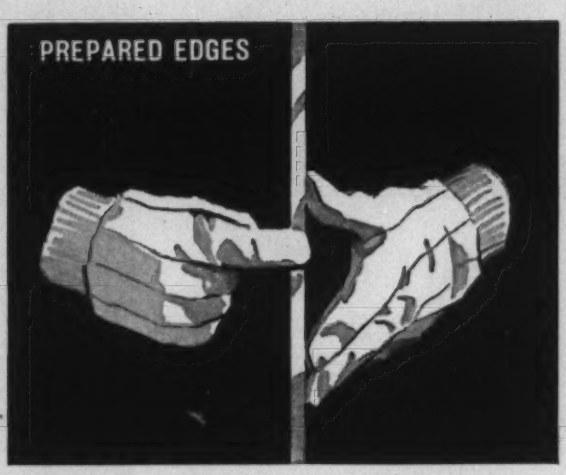
If your fabricating machines require a special width strip that's just what you'll get with Amerstrip. USS Amerstrip can be produced in any width under 24 inches . . . well within exacting tolerance limits.

USS Amerstrip can be supplied in the thickness your machines demand. USS Amerstrip is fabricated on large production runs down to thickness tolerances as close as plus or minus .0005 inches.

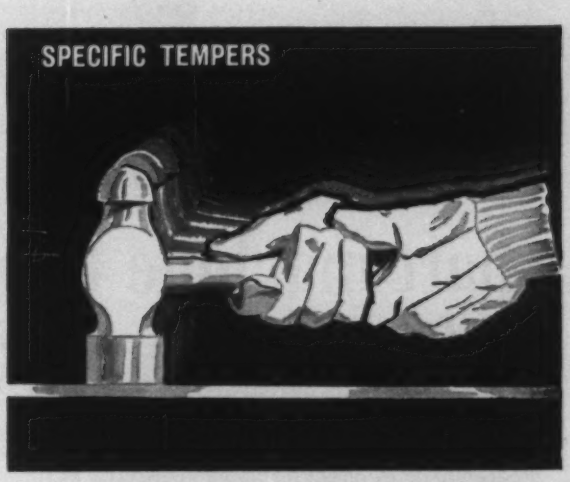
American Steel & Wire representatives are experts in the fabrication and application of USS Amerstrip Cold Rolled Strip. Whenever you have a need or problem involving cold roll let these experts show you how USS Amerstrip can do it better. Get in touch with our nearest representative or write to American Steel & Wire, Dept. 0237, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS and Amerstrip are registered trademarks

controlled" cold rolled strip steel



Because USS Amerstrip is produced in precision, order-size quantities, it can be supplied with the edge finish you need . . . square, standard, round, full round or bevel.



Whether your product must undergo a deep draw or other severe forming operation or require a special temper for rigidity, you'll get the exact temper you need when you order USS Amerstrip.

Whatever the size of your order . . . very large or very small, every coil of USS Amerstrip will be uniform in finish, in temper, in width and thickness. The use of USS Amerstrip will assure continuous production and high yields.

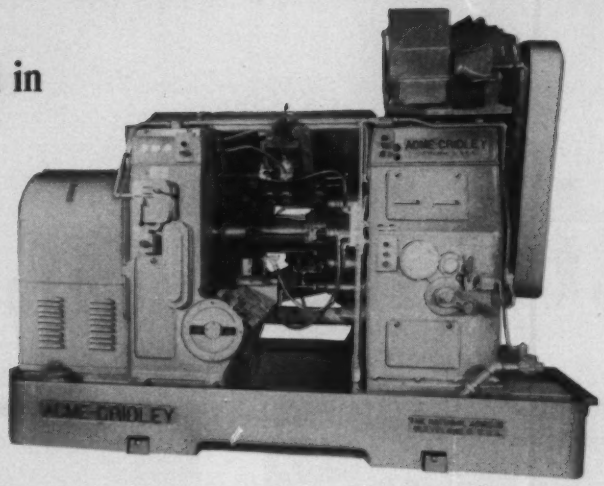
DESIGNED FOR END USE

This is really the sum total of all these other advantages. Because USS Amerstrip is "Quality-Controlled," because it is engineered to meet your needs, it assures you smoother, faster operation; a better, more salable finished product.

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

Major breakthrough in shaft production . . .



Acme-Gridley multiple-spindle shaft machine equals output of four automated lathes

At Chrysler Corporation's Trenton, Michigan, Engine Plant, a remarkable new National Acme shaft turning machine has slashed camshaft production costs; is hailed as a major production development for the entire industry. Performing complete shaft journal machining in a single set-up, this rugged 6-spindle automatic provides substantial savings in floor space and capital outlay, reduces scrap loss and enables closer control of machining operations.

Key to this dramatic pay-off are imaginative National Acme solutions to the difficult problems of centering, driving, and stabilizing the long, flexible shaft during turning operations. An ingenious part-holding technique exposes bearing journals for turning—an impossibility in a chucking set-up.

Extreme capability is stressed in the design of the Universal Multiple-Spindle Shaft Turning Machine and permits the maximum number of machining operations to be performed on straight or flanged shafts held between centers.

The shaft turning machine is additional evidence of National Acme know-how applied to the solution of special machining problems. This same insight and ability is available to any manufacturer interested in reduced costs and increased production. Our representative is as close as your telephone.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Chrysler Corporation . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

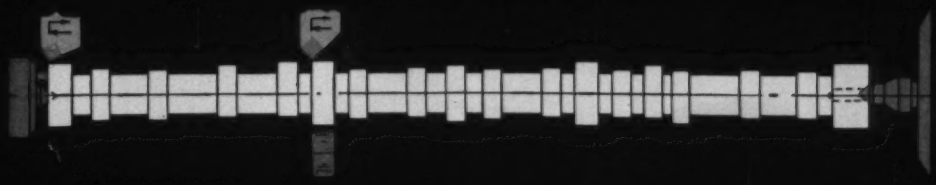
National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

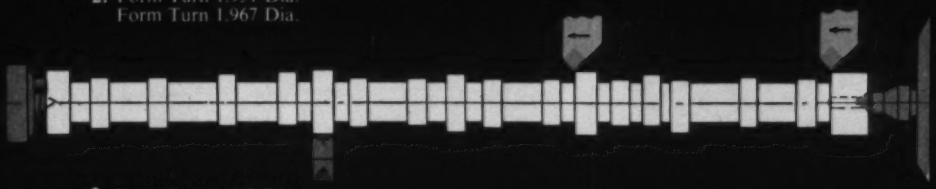
MMT-PE

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

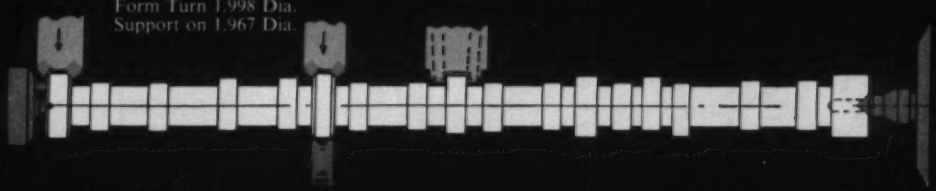
1st position—load and unload



2. Form Turn 1.951 Dia.
Form Turn 1.967 Dia.



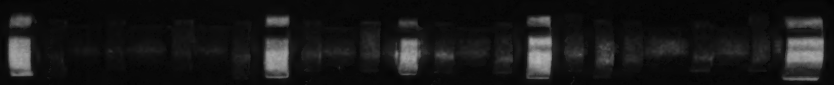
3. Form Turn 1.982 Dia.
Form Turn 1.998 Dia.
Support on 1.967 Dia.



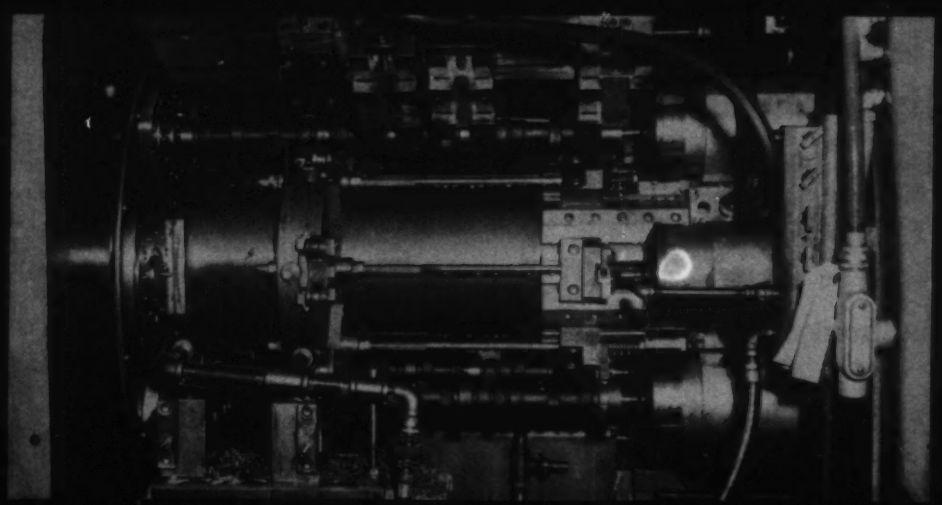
4. Chamfer O.D. of 1.951 Dia.
Chamfer O.D. of 1.967 Dia.
Face Sides of 1.743 Dia.
Support on 1.967 Dia.

5. Face End of Camshaft
Relieve Turn 1.743 Gear Dia.
Support on 1.967 Dia.

6. Chamfer O.D. of 1.743 Dia.
Chamfer O.D. of 1.982 Dia.
Chamfer O.D. of 1.998 Dia.
Support on 1.967 Dia.



High-test cast iron camshaft with journal machining completed . . .
13 operations in 22 seconds.



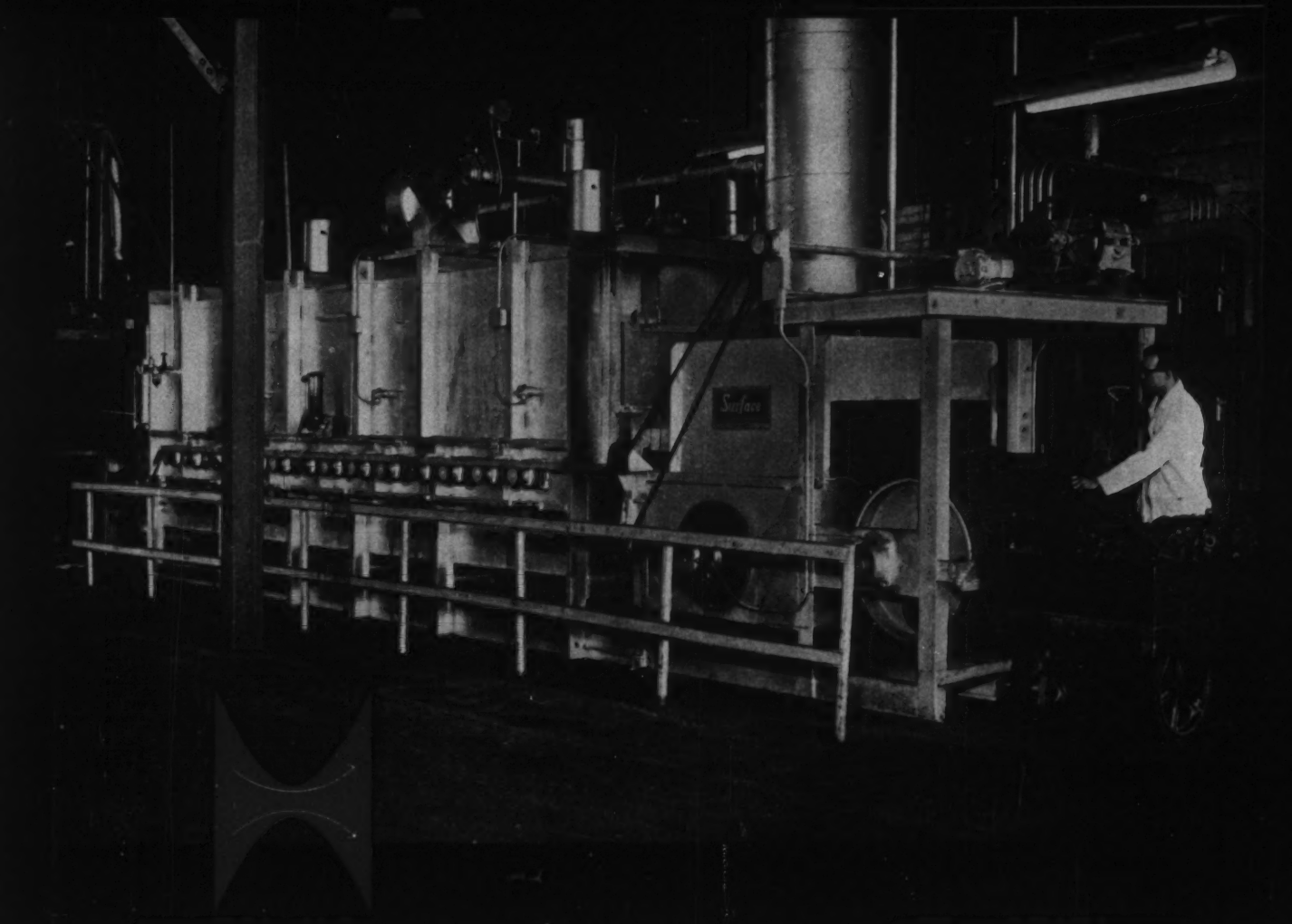
Close-up of tooling zone. Open spindle in load and unload position shows unique centering, holding and driving mechanism.

"We have learned to rely on Sharon for top quality Stainless Steels"—

JOHN SHRAGG, Foreman of the Press Dept., Ekco Products Company

"Modern utensil design calls for real workable stainless steels," says John Shragg, press room foreman at Ekco Products Company's Massillon, Ohio, plant. "For consistently fine quality," he continues, "we have found we can always rely on the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**



SURFACE POWER CONVECTION EQUIPMENT cuts Ross Gear forging process time 50%

High speed, high volume air circulation is the feature of this Surface continuous draw furnace, which enabled Ross Gear and Tool Company, Lafayette, Indiana, to

(1) process a wide variety of steering gear forgings much faster than with the batch type furnaces replaced. These forgings range from a few ounces to 22 pounds.

(2) draw forgings at rates to keep up with production in hardening operations.

(3) reduce handling operations, consequently reassign personnel to more productive jobs.

The furnace has three separately controlled zones, each with its own burners and fan. The uniformity of furnace temperature from zone to zone is consistently held within ±5°F.

Mr. Leonard Ewalt, Chief Metallurgist of Ross Gear, reports: "The furnace will heat through a 2-inch section in approximately 40 minutes—just about as fast as the metal can take it when heated by convection . . . I would say that with this method of distributing heat in the zones and the rapid heating rate, this Power Convection furnace* is a couple of years ahead of its time.

We're not waiting for tomorrow, either. We're getting results today."

Write for bulletin SC-182. Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface

A division of Midland-Ross Corporation

MR

METALS WAREHOUSE CHOOSES STEELWELD SHEAR

Shearing A7 carbon plate ½" x 96" x 30'. This is a mechanically operated 12E-12 Steelweld Pivoted-Blade Shear.

Proves Highly Advantageous in New Berkeley Warehouse of Ducommun Metals & Supply Co.

VERSATILITY, speed, accuracy and ease of operation were dominant factors that led Ducommun Metals & Supply Co. to select a Steelweld Shear for its new metals warehouse in Berkeley, California.

Write for free MECHANICAL SHEAR CATALOG No. 2011 or HYDRAULIC SHEAR CATALOG No. 2030

STEELWELD

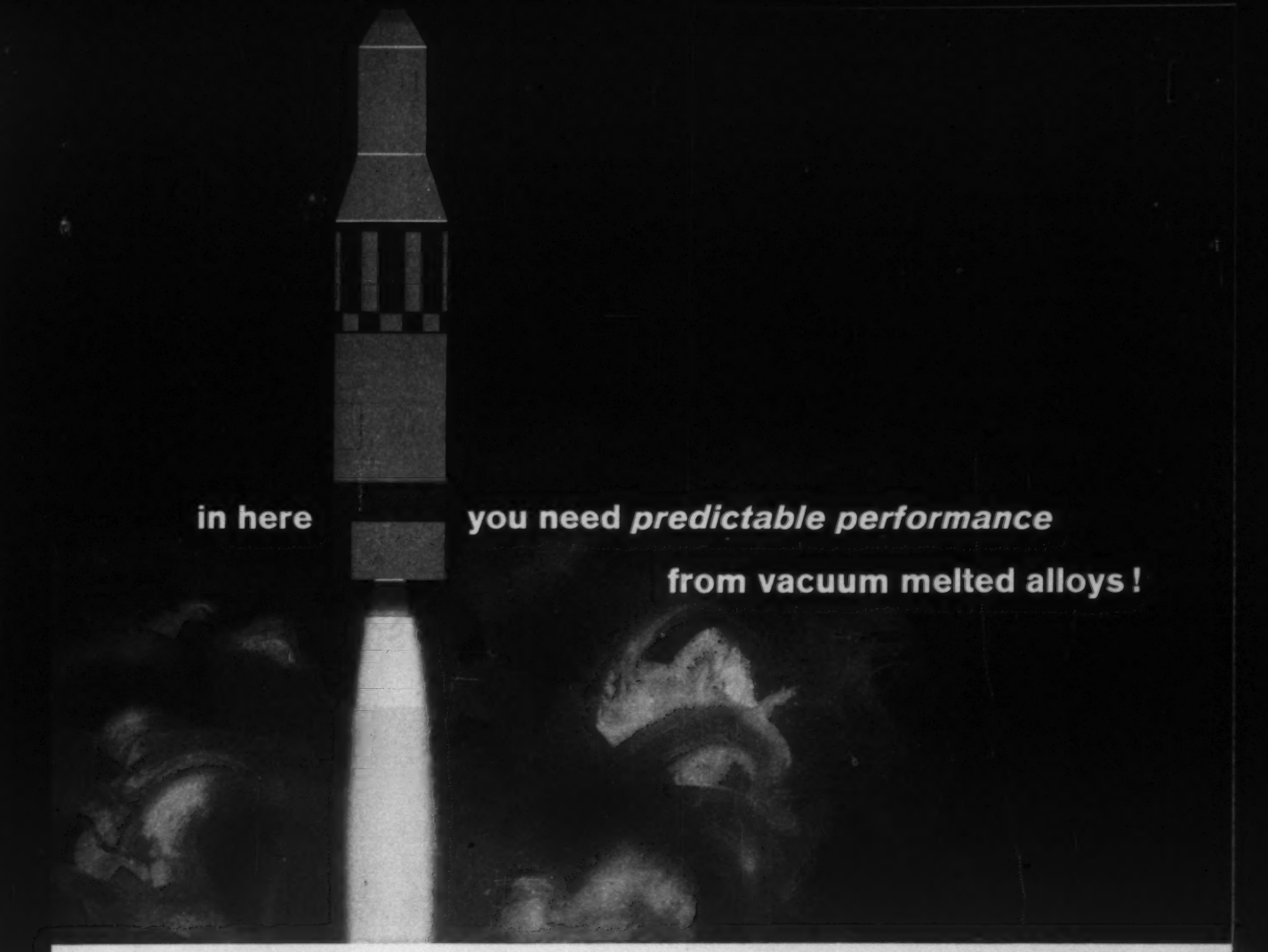
PIVOTED BLADE Mechanical and Hydraulic **SHEARS**

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

Ducommun's report on the shear follows:

1. **Used for:** A7 plate 3/16" to ¾" x 12 ft.
   Aluminum plate 3/16" to ¾" x 12 ft.
   Stainless plate 1/8" to ½" x 12 ft.
   Brass & Copper 3/16" to ¾" x 8 ft.
2. An important advantage is ease of shearing a wide variety of types and sizes of metals each day from thin narrow strips to heavy, wide plates. The knife clearance adjustment, plus the fast and accurate power back gage, makes changes from one thickness and size to another very fast, yet permits us to produce high quality shearing.
3. Another reason for selecting the Steelweld Shear was the low rake angle of the blade. This permits flatter shearing.
4. The power back gage offers a plus factor in that we can use it in conjunction with our front feed rolls to back off plate for accurate alignment when shearing to a front gage.
5. When the Steelweld Shear was being installed, our sheet shear was being re-located in the warehouse, and we could not shear an order for 26 gage stainless. With the Steelweld knife clearance adjustment, we were able to shear the material very accurately with a minimum of burr.
6. Operator is very pleased with ease of operation and the many adjustments available.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7861 E. 282 ST. • WICKLIFFE, OHIO



Guesswork has no place here. High temperature alloys that make up this missile's critical components must be right every time . . . with predictable performance built into each forging, fastener, and other component parts.

Vacuum melted alloys—new, predictable performing alloys made by Carpenter's exclusive VACUMELTROL and CONSUMET* processes—provide this dependability. And with it, component manufacturers report improved forgeability, better finishes, fewer rejections, faster production.*

Carpenter's many years' experience in producing these cleaner, more uniform and dependable vacuum melted alloys is your assurance of the best predictable performance at elevated temperatures . . . or at any temperature.

A call to your Carpenter representative will put this experience to work for you today. The Carpenter Steel Company, Reading, Pa.

**Carpenter trademarks for alloys melted in vacuum induction and consumable electrode furnaces, respectively.*

a new company 70 years old

Carpenter steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

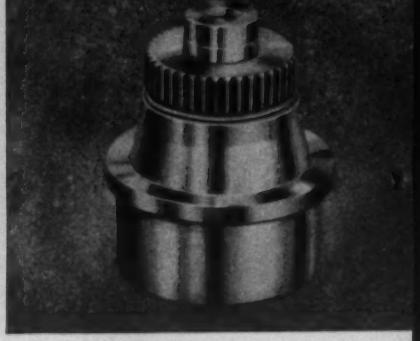
UNBRAKO

INDUSTRIAL FASTENERS like this Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.

SPS AIRCRAFT

AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.

SPS NUCLEAR



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

SPS quality control proves

Acid etch and magnetic particle tests are performed by SPS quality control experts like Rouse Roberts, shown here examining grain flow of the metal in a socket screw cross section.

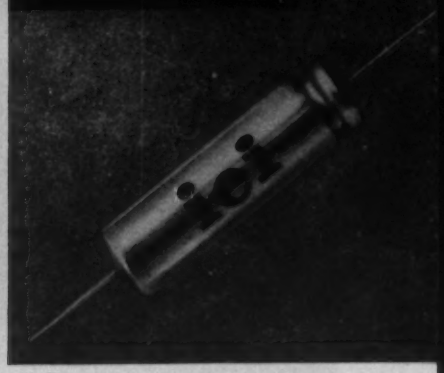
HALLOWELL

SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

COLUMBIA

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

I. E. I.



CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

reliability is more than skin deep

A hundred times a day, Rouse Roberts, "Mr. Reliability", peers through his microscope to check grain flow in fasteners.

All around his quality control station, huge machines form UNBRAKO Socket Head Cap Screws.

Before and during every production run, fasteners from each machine must pass his tests. He cuts a cross section of the cap screw head . . . etches it with acid . . . and examines it under a microscope. Special lighting reveals the grain flow of the metal.

Flow lines that bend around the fillet with no interruptions indicate a strong, reliable, forged head. Satisfied with the grain flow, "Mr. Reliability" then runs a magnetic particle test to reveal hidden cracks or flaws.

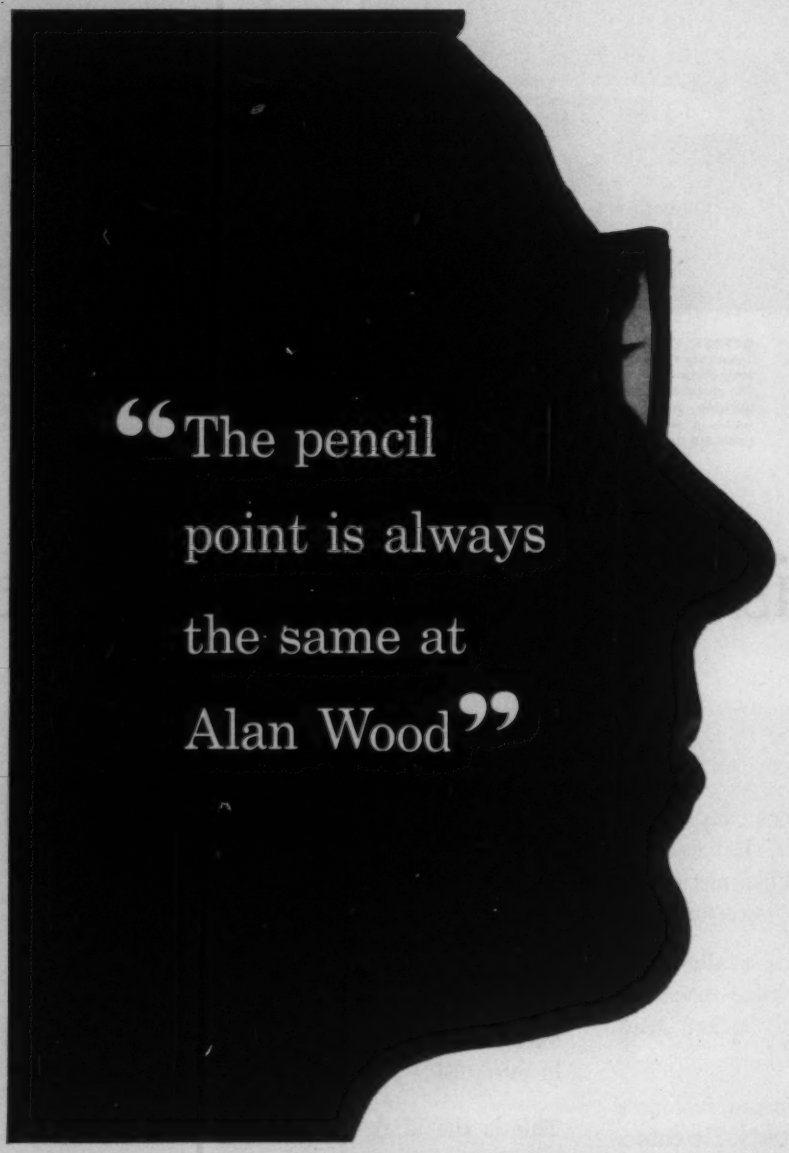
Just three minutes cover both tests. At any time, a signal from Rouse can shut down a machine until its production once again meets SPS reliability standards. And there is a "Mr. Reliability" in every SPS production department.

This is the kind of painstaking, quality control that has made SPS today's leading producer of high reliability fasteners for the demanding '60's.

The new 18-page booklet, "Evolution in Socket Screw Design", will explain this development to you in much greater detail. Write for a copy now.

UNITED STATES CANADA **SPS** *where reliability replaces probability* GREAT BRITAIN EUROPE

STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Limited, Coventry and Sheffield, England Unbrako Schrauben GmbH, Dusseldorf and Koblenz, W. Germany.



"Doing business with Alan Wood, we never have to worry about variations in pricing policy. Whether steel is short or plentiful, the pencil point is always the same."

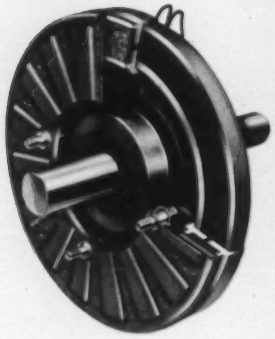
That's the way one Alan Wood customer said it, and we appreciate the acknowledgement. We do believe in consistent pricing policy. Moreover, Alan Wood is geared to give your order prompt attention without red tape delays. Your quality goes up, your costs and rejects go down, when you use dependable Alan Wood plate, sheet and strip.

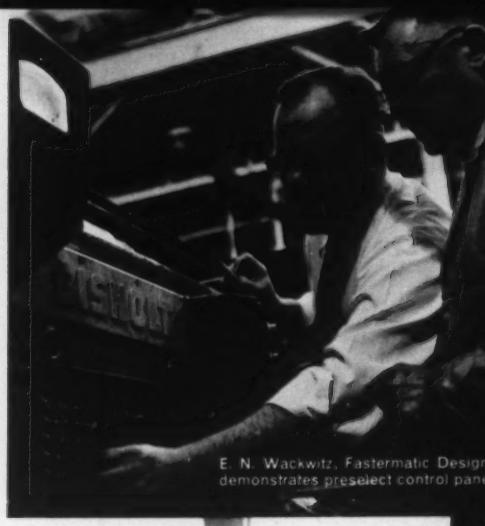
When your metallurgical requirements need speedy, reliable analysis, ask for an Alan Wood study. Your Alan Wood representative is always available, ready to help.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta
Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle
Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Limited





E. N. Wackwitz, Fastermatic Design demonstrates preselect control pan

Gisholt pyramids product improvements from Warner electric clutches

Even though tax laws say the test of time governs economic life of capital equipment, smart marketers like Gisholt Machine Company know that better machines will justify replacement and increase their sales.

That's why E. N. Wackwitz, head of Fastermatic engineering, set up both engineering and economic criteria for the new turret lathes Gisholt introduced in 1955.

The old Fastermatic was underpowered, not fast enough, and too light for modern machining. But more brawn was not the complete answer for Gisholt. The design team looked at the customer's problem—saw the cost-price squeeze he was in, and set out to develop a machine that would lead the market. This, at a time when industry was heading into automation and tape control.

50% faster setup through switches

Out of this analysis came a new type of turret lathe, boldly festooned with neat rows of toggle switches to control all important machine functions automatically—a machine that can change its own speeds and perform other functions in accordance with information fed into it by switch settings. Result: 50% faster setup, easier operation, more work on the floor at the end of the day. Gisholt found new control concepts they needed in Warner electric clutches capable of producing instant, automatic speed changes under high torque conditions. Four spindle speeds, controlled by energizing the right combination of clutches, are masterfully designed into the headstock gearing. Best speed can be preset for each operating sequence. Electric clutches produce high torque per square inch—permit mounting on short, stiff shafts. There are no sliding gears or complex actuating devices.

E. N. Wackwitz, G. M. Class, Vice President, and Warner District Sales Manager

J. T. Murray, Supervisor of Assembly

E. C. Helmke,
Chief Engineer

J. L. Menhall, Assistant Purchasing Agent
and F. C. Huegel, Purchasing Agent.

sign Engineer,
anel.

Warner electric motion control

R. H. Bruce,
General Sales Manager

As pointed out by E. C. Helmke, Chief Engineer, direct electrical actuation eliminates cams, dogs, and other gingerbread controls.

Control-ability widens the market

Gisholt is out to give the customer wider work range for his money. Vice President G. M. Class quickly points out that the automatic clutches and constant-mesh gears permit changing speeds without stopping the machine. Thus, optimum stock removal rates can be maintained when facing or contouring.

General Sales Manager R. H. Bruce appraises marketability of the new *Warner-equipped* Fastermatic this way. With the preselect panel and faster setup, it is now economical to machine short-run jobs formerly done on hand-type turret lathes. For customers who want to control production from the front office, all motions, including longitudinal feed of the turret and transverse motion of the cross slides, may be wired into a punched card or tape system.

From a manufacturing standpoint, John Murray, Supervisor of Assembly, likes the new headstock because assembly is easier. Thrust loads are on the front wall. The actuating system is a simple wiring job. Very little inspection and no run-in are necessary for the Warner clutches. In fact, no power is applied until the machine reaches the test floor. Cushioned reaction, adjustable by rheostat, saves wear and tear on machine parts.

Warner has geared its operations to the problems of machinery builders. Power transmission distributors carry replacement parts in all manufacturing centers. These requirements are watch-dogged by F. C. Huegel, Purchasing Agent, and J. L. Menhall, his assistant. Purchasing plays an important marketing function as well. Warner engineers are encouraged to work closely with Gisholt people to assure maximum co-ordination.

Machine tool buyers look at controls first, so why not put proved performance where your customers see it?

Electric motion control by Warner is pioneering new concepts in machine design. Improved synchronization, rapid cycling, fine inching and jogging, tension control, no-load starting, rotary indexing and linear positioning, foolproof interlocking, and other articulate functions can make any machine more valuable to the user . . . at the same time reduce cost by eliminating unnecessary parts. That's why a Warner sales engineer can be a valuable contributor to your product improvement program.

WARNER

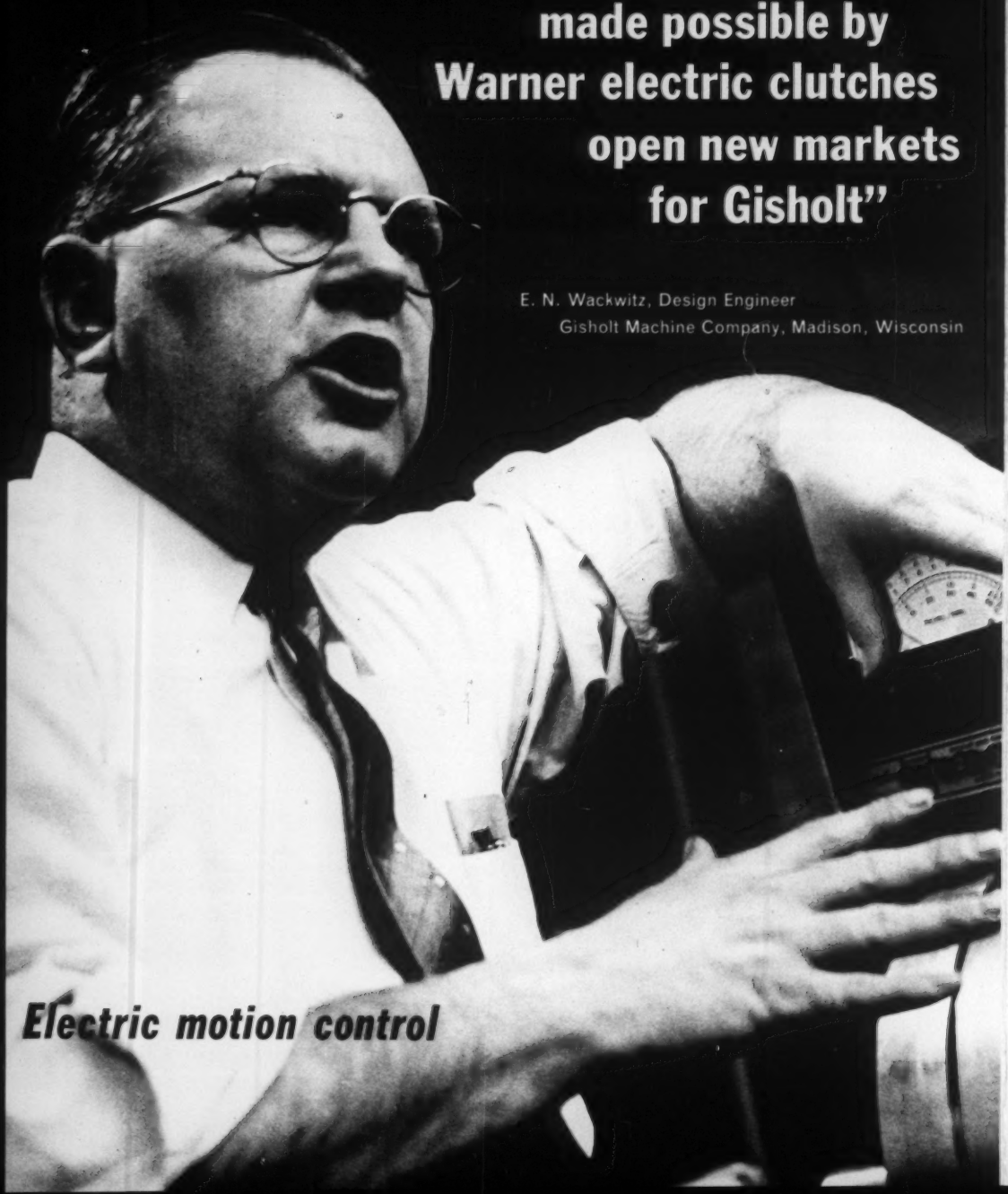
Warner Electric Brake & Clutch Co.
Beloit, Wisconsin

Product Improvement Ideas

from **WARNER**

"Control innovations made possible by Warner electric clutches open new markets for Gisholt"

E. N. Wackwitz, Design Engineer
Gisholt Machine Company, Madison, Wisconsin



Electric motion control

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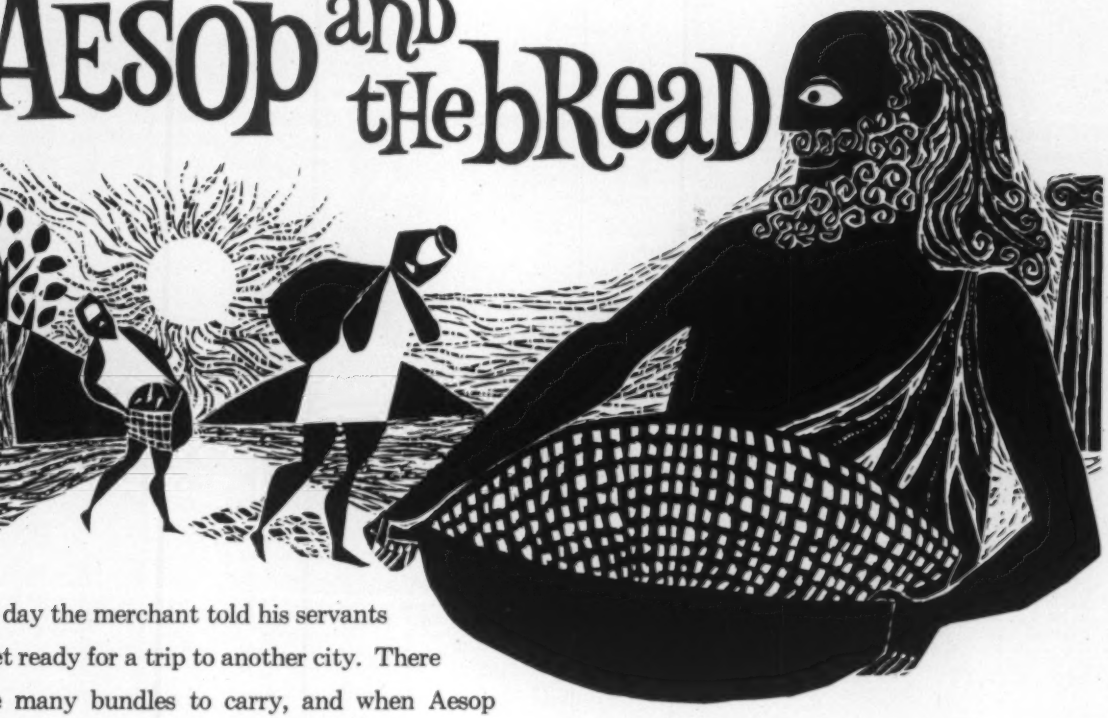


day the merchant told his servants
t ready for a trip to another city. There
many bundles to carry, and when Aesop
them all he said to his fellow servants, "If you
e carry the lightest bundle, I'll tell you many fine stories as we walk." The servants agreed be-
e they liked Aesop's stories. But when Aesop picked up the heaviest bundle of all—a large basket
ead — the other servants laughed at him. He barely could manage to carry it. Around noon, the
elers stopped to rest and eat their dinner. Aesop gave each servant a loaf of bread for dinner, so
big basket wasn't as heavy during the afternoon. When the sun went down, Aesop gave each
ant a loaf of bread for supper, and the big basket was empty. The next day the merchant and
ervants went on to the city. Aesop had nothing to carry but his empty basket, so he told stories
e other servants while they struggled under their loads.

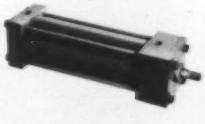
oral: Alert analysis wins out in the end.

you analyzed your machines to make sure that proper
r designs are providing most efficient production? Ask
ydro-Line representative to help you. Of course, he might
ell you a Hydro-Line cylinder or two, but only if you really
hem. And his analysis now may save you considerable
nd money later.

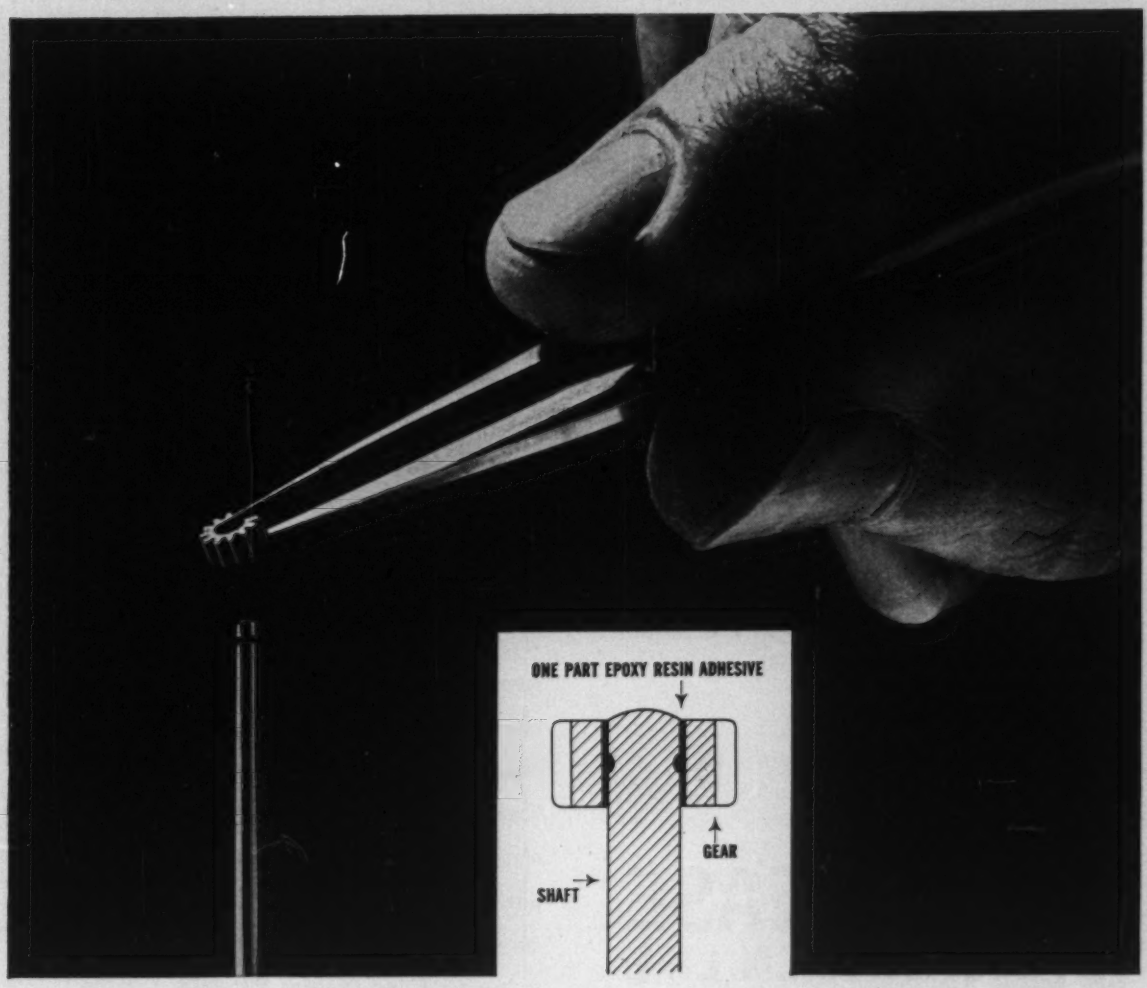
Hydro-Line representative will recommend standard stock
rs if he can . . . they have all catalog stock dimensions,
ou less, and can be delivered immediately. If a stock
cylinder is unsuitable for your application, he'll recommend the proper modified standard cylinder, which has its own stroke or other deviations from catalog stock dimensions. Either way, you can be sure that the best cylinder design is working to help you gain more production and earn more profits.

Look in *Sweet's Product Design File* (Bulletin 8a-Hy) for standard dimensions of stock cylinders and the address of your nearest Hydro-Line representative. Ask him to analyze cylinder requirements in *your* plant soon.

HL HYDRO-LINE CYLINDERS



5600 PIKE ROAD, ROCKFORD, ILLINOIS manufacturers of: high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • booster cylinders



How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBEE40, St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

INCREASE CAMPAIGN LIFE UP TO 18 MONTHS WITH KAISER BLAST FURNACE CASTABLE*

WHAT IS KAISER BLAST FURNACE CASTABLE? It is a dry-mix gunning material for the full range of blast furnace lining, including area below the tuyeres. The material is a hydraulic setting, high strength clay product made with a very pure calcium aluminate binder (low in iron to resist effect of CO disintegration, and high in strength to resist abrasive conditions).

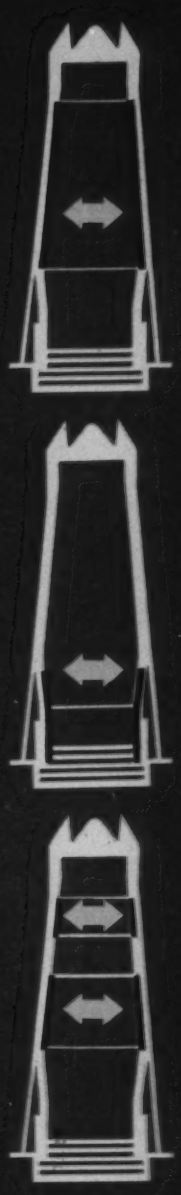
WHEN SHOULD IT BE USED? Kaiser Blast Furnace Castable was developed specifically to provide a quick, economical and dependable means of prolonging furnace life without a major reline. Thus, it may be used when a furnace must be kept on the line to meet heavy production schedules, or it may be used to improve production economy by extending normal productive life of a furnace.

HOW FAST CAN THE MATERIAL BE PLACED? When down time is an important consideration, Kaiser Blast Furnace Castable can be gunned into place—around the clock—at a rate of up to 9000 pounds per hour per gunning unit. Service can be resumed in a fraction of the time needed for other methods of repair or rebuild! Curing is accomplished with normal heat-up procedure. (Actual down time varies, of course, with amount of surface preparation—cleaning slag, coke, limestone, etc. from the existing brickwork.)

WHAT IS THE COST AS COMPARED TO BRICK? Cost of actual repairs made with Kaiser Blast Furnace Castable is only about one-fourth the cost of repairs made with brick. Even more important, cost- and profit-wise, is the additional iron production made possible by increased campaign life.

HAS KAISER BLAST FURNACE CASTABLE BEEN PROVED IN SERVICE? Yes. The three locations described at right show the range of installations now in service.

*Formerly MEX-R-CO BF Blast Furnace Castable.



LOCATION NO. 1. 28-ft. diameter furnace, capacity 2000 N. T. per day. 287 tons Kaiser Blast Furnace Castable installed, starting at tuyeres and extending to wear plates. Thickness of material varies from 6 to 26 inches. Total installation time: 90 hours.

INCREASED CAMPAIGN LIFE: 15 months (and still in service).

LOCATION NO. 2. 20-ft. diameter furnace. 65 tons Kaiser Blast Furnace Castable installed, beginning slightly below tuyeres and extending upward toward mantle. Thickness of material varies from 4½ to 13½ inches. Total installation time: 22 hours.

INCREASED CAMPAIGN LIFE: 12 months (and still in service).

LOCATION NO. 3. 28-ft. diameter furnace, capacity 1300 N. T. per day. 100 tons Kaiser Blast Furnace Castable installed, one section extending from mantle upwards 16 feet with average thickness of 16 inches; second section extending from wear plates downwards 10 feet, with average thickness of 7 inches. Total installation time: 29 hours.

INCREASED CAMPAIGN LIFE: 12 months.

For full details on these installations—and to learn how you can achieve increased campaign life—contact your Kaiser Refractories sales representative.

Call or write Kaiser Refractories and Chemicals Division, Dept. SO221, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
MEXICO, MISSOURI . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . 300 Lakeside Drive

KAISER REFRACTORIES

MEXICO REFRACTORIES NOW MERGED WITH KAISER REFRACTORIES
MEX-R-CO Nigh Alumina, Fire Clay and Silica Refractories
Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

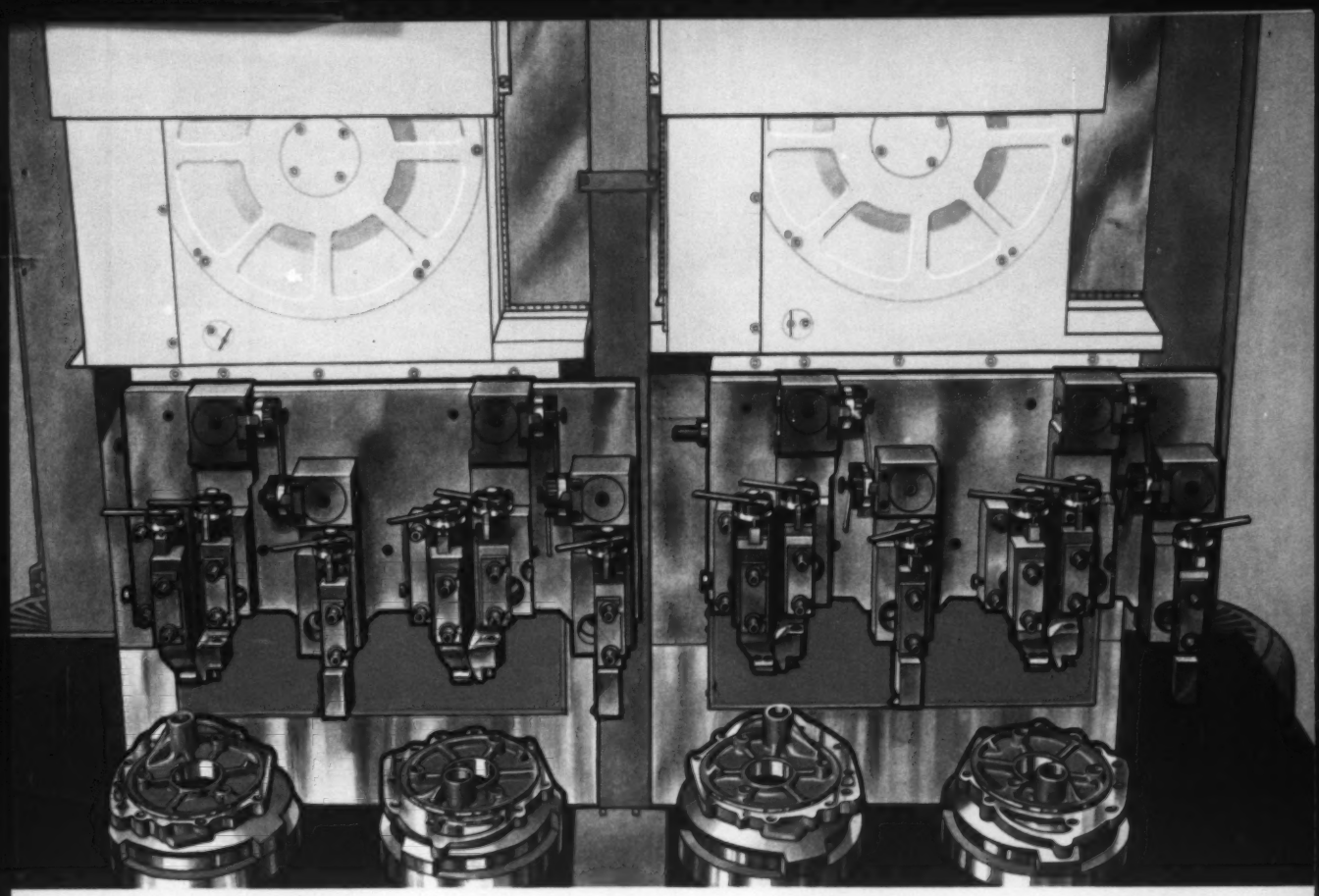
ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE



Precision boring
New Britain's new approach

New Britain Cam Actuated Vertical Precision Boring Machines offer an entirely new principle for more accurate boring and turning, plus compact exterior design and fast tooling. Rough cuts and finish cuts within close tolerances on the same set-up are characteristic. Standard models are available with maximum swing from 12″ to 17¾″ in 10 or 15 horsepower.

Here are a few of the major new developments incorporated in these unusual machines.

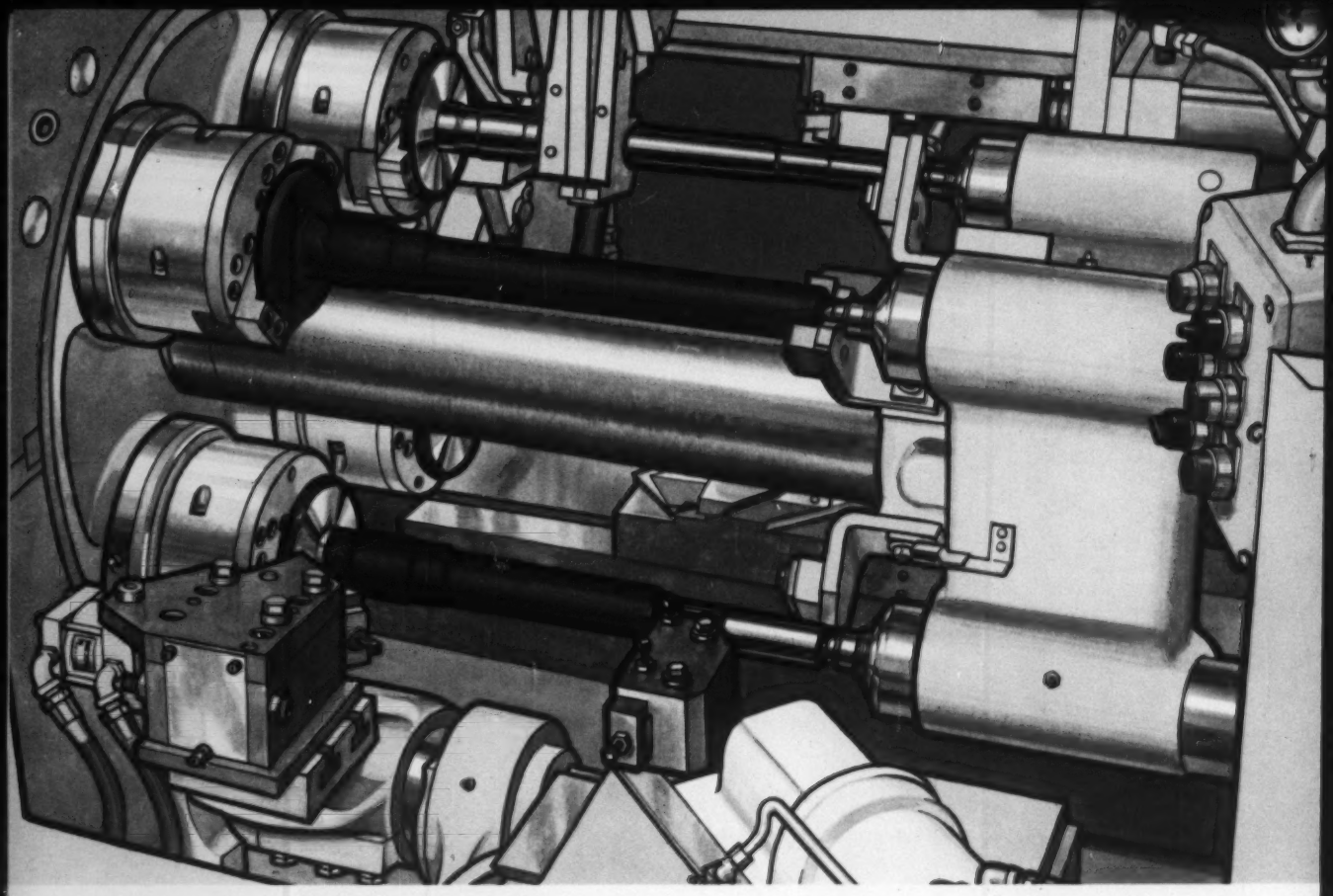
Greater accuracy. Both the vertical and cross slide cams are mounted on a common shaft which is contained inside the vertical slide. The linkages found in conventional cam-operated contouring machines are eliminated. Both the vertical and cross slides ride on preloaded roller bearings and are deflection-free.

Clean-sided design. Any number of these self-contained machines, each with one or more spindles, can be arranged side by side. Depending on how they are tooled, they operate either as a single unit or as individual machines. Parts can be inverted on adjacent machines or on adjacent spindles of the same machine, finishing both sides, completing *all* operations in one integrated, high-volume operation.

Fast tooling. Unrestricted accessibility allows rapid tool and cam changes.

Complete catalog material is available.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut



Idea for volume producers of shafts

Economists are making startling predictions on this year's increase in productivity. They say it will be twice that of recent years—up as high as 10% in some manufacturing industries.

Whether or not these predictions come to pass, it's certain that it won't happen in plants using outdated equipment.

Shaft work is a problem to many firms. New Britain pioneered template-controlled contour turning and boring, solving the problem for many progressive companies. Now for the manufacturer with really high volume requirements we present Model 412/25–a four-spindle, template-controlled machine capable of producing a four-fold increase in productivity per man hour.

The basic principle pretty much speaks for itself. As in the case of the single-spindle contour lathe, inexpensive metal templates control the full cycle and re-cycle if required. Simple, single-point tools replace complex gang tooling. Setup is simple and fast. When tools wear, merely replace them. Since all relationships are maintained by the template, tool replacement involves no problem.

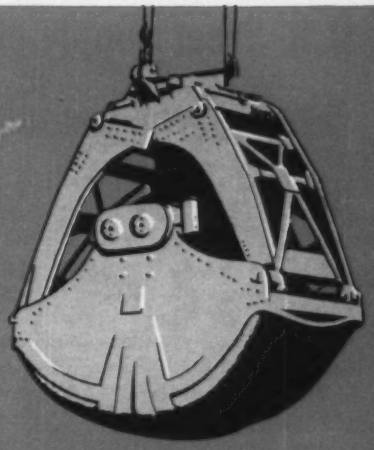
When the volume of contour turning warrants it, this machine can be the best money maker on the production floor. Your New Britain representative can quickly tell you after looking at your prints and learning of your production requirements. Meanwhile, we would be glad to mail you descriptive literature containing the basic facts and specifications. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut

MORE THAN HALF

of the heaviest cranes in American steel mills are built by

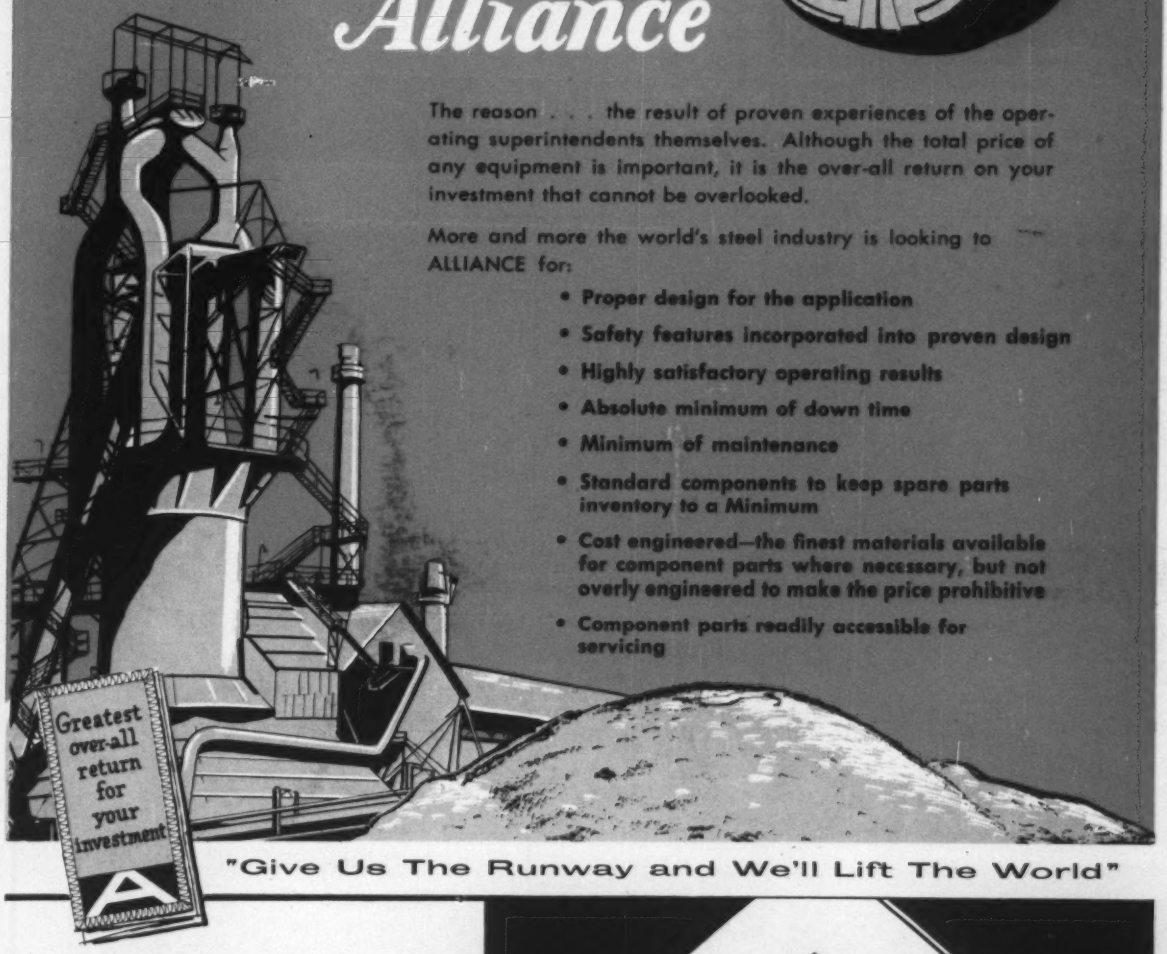
Alliance



The reason . . . the result of proven experiences of the operating superintendents themselves. Although the total price of any equipment is important, it is the over-all return on your investment that cannot be overlooked.

More and more the world's steel industry is looking to ALLIANCE for:

- Proper design for the application
- Safety features incorporated into proven design
- Highly satisfactory operating results
- Absolute minimum of down time
- Minimum of maintenance
- Standard components to keep spare parts inventory to a Minimum
- Cost engineered—the finest materials available for component parts where necessary, but not overly engineered to make the price prohibitive
- Component parts readily accessible for servicing



"Give Us The Runway and We'll Lift The World"

Overhead Cranes * Gantry Cranes * Mill Cranes and Equipment * Hot Metal Cranes * Ladle Cranes Stripper Cranes * Soaking Pit Cranes * Soaking Pit Cover Cranes * Charging Machines * Furnace Chargers * Slab Handling Cranes * Bucket Cranes Magnet Cranes * Mold Yard Cranes * Skull Cracker Cranes * Ingot Buggies * Run-Out Tables Car Dumpers * Special Mill Equipment * Ore & Coal Bridges * Loading & Unloading Towers Forging Manipulators * Forging Cranes * Power House & Dam Cranes * Dock & Pier Handling Equipment * Research, Development & Engineering Service * Licensees & Manufacturing Facilities in Other Countries.

the *Alliance*

machine company

Main Office • Alliance, Ohio

U.S. Steel Supply gives improved sheet and strip service through Wean-equipped coil processing centers

The most modern sheet and strip processing equipment available was recently installed in U. S. Steel Supply's Chicago, Los Angeles and Newark steel service centers. This equipment was built and installed by the Wean Equipment Corporation—an established leader in the design and manufacture of machinery for coiled metals processing.

For U. S. Steel Supply's sheet and strip customers, the installation of these coil processing facilities means faster, more efficient service. For example, the new "Flying Press" shearing line at our Chicago steel service center offers blanks in widths 18″ to 72″ and lengths from 18″ to 20′, and the new 52-inch slitting line offers widths of slit coil down to ½″. Both lines are designed to handle gauges from .015″ to .135″ in steel and aluminum.

This equipment produces blanks to a stretcher-levelled standard of flatness—ready for manufacturing operations. Resquaring is unnecessary! The availability of our equipment can eliminate a major capital expenditure by your company. Besides, you eliminate scrap loss, cut handling time and get right-to-your-production-floor delivery!

We're anxious to prove to you that U. S. Steel Supply has the finest sheet and strip service available today. Call your U. S. Steel Supply Steel Service Center on your next order. You'll find our phone number in the Yellow Pages under *Steel*.

USS is a registered trademark

Coil Processing Centers by:

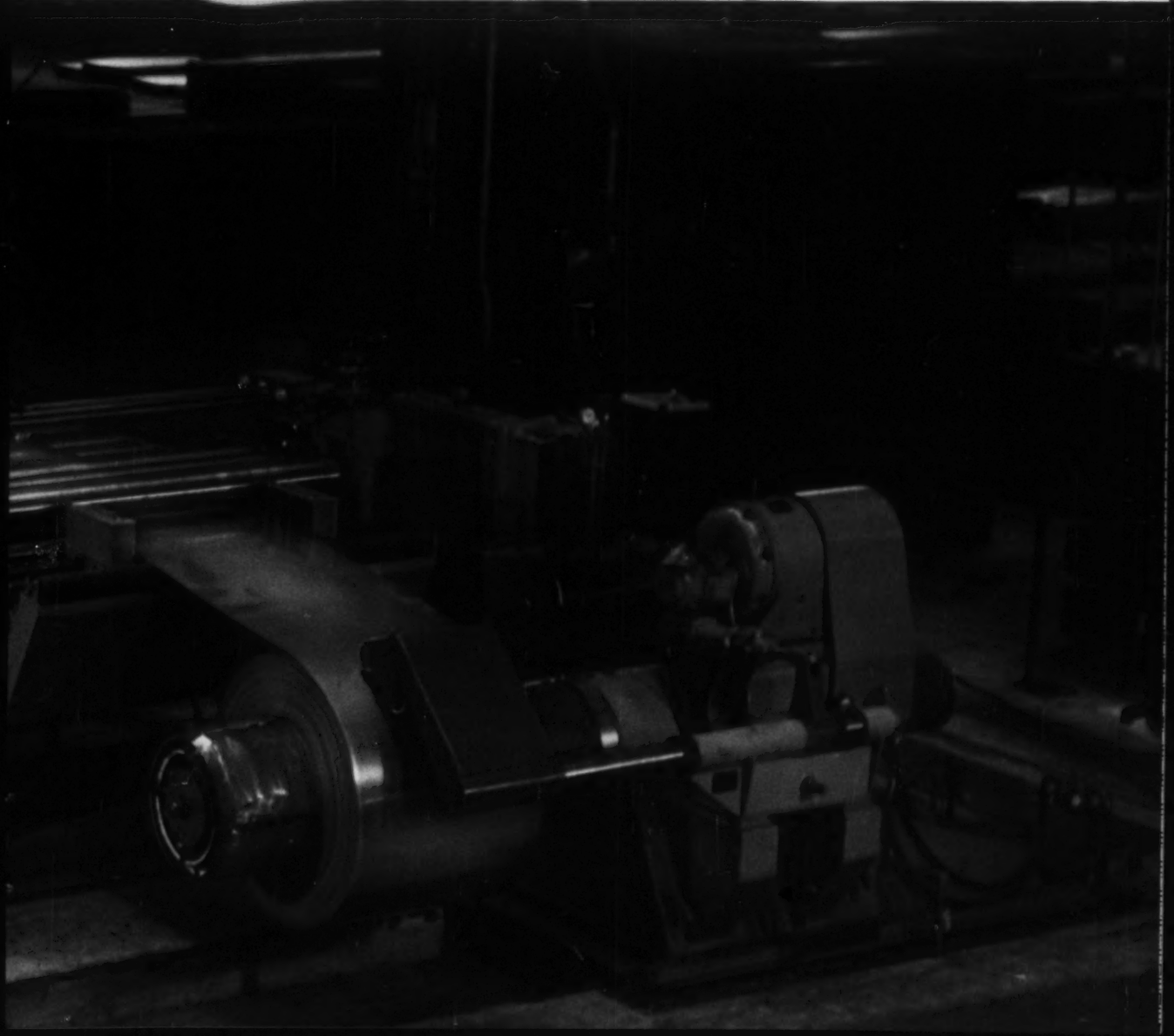
WEAN

Wean Equipment Corporation, Cleveland 17, Ohio

USS

U. S. Steel Supply Division of United States Steel

General Offices: 208 South LaSalle St., Chicago 4, Illinois



A NEW IMPACTOOL

...WITH EXTRAS THAT PAY OFF FOR SMART TOOL BUYERS!

6-Vane Air Motor

Compare a "six" with a "four"! I-R's 6-Vanes give you greater power, smoother operation, higher starting torque.

"2-Pack" Construction

Either the impact mechanism "pack" or the motor "pack" can be serviced individually without disturbing the other.

Rugged Steel Hammer Case

For a lifetime of service! This exclusive I-R feature protects hammer mechanism, but is lightweight for easy handling.

new

Size 808 Impactool

⅝" drive

"Cuss-proof" Socket Retainer

Sockets can't fall off accidentally, but strong, spring-held retainer can be easily replaced. Another I-R exclusive.

Built-in Air Control

Air-balanced throttle valve provides full power range with smooth and complete control. Not just an "on and off" throttle.

Precision Quality

Special electronic equipment double-checks machined parts for perfect mating of all surfaces and bores.

LOOK FOR I-R EXTRAS BEFORE YOU BUY!

Smart buyers and experienced tool men know these Ingersoll-Rand EXTRAS pay off . . . in terms of longer tool life, easier maintenance, and better nut running performance. With them you get 20% more power and 200% faster rundown in a precision tool so small (7½") and light (8⅞ lbs.) you can use it anywhere.

For details on the all-new Size 808 Impactool, call your I-R representative today. Or write: Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

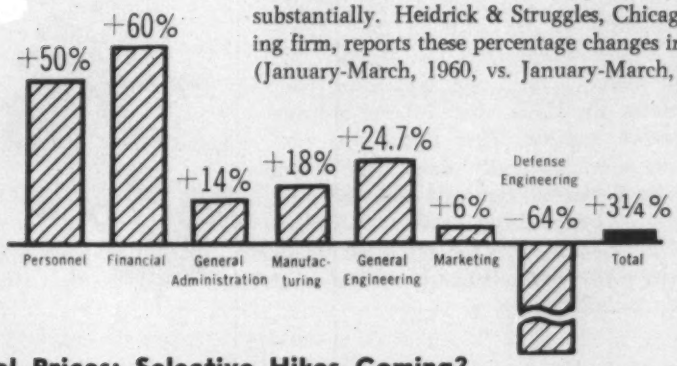
34A-8

Ingersoll-Rand

Tools plus AIRengineering increase output per man

Demand for Executives Is Near Peak

Demand for executives to fill top level jobs is up substantially. Heidrick & Struggles, Chicago recruiting firm, reports these percentage changes in demand (January-March, 1960, vs. January-March, 1959):



Steel Prices: Selective Hikes Coming?

Asked about the possibility of an industrywide price increase, Edmond P. Severns, chairman and president, Continental Steel Corp., says that when and if one becomes necessary, it might well be selective—excluding some of the finished steel products affected most by foreign competition.

Sales Curves Are Turning Up

February new orders for material handling equipment jumped 12 per cent above the January level, reports the Material Handling Institute . . . February orders for foundry equipment soared 34 per cent above the January pace, Foundry Equipment Manufacturers Association says . . . February shipments of commercial steel forgings totaled 130,000 short tons—up 6 per cent from January's and up 15 per cent from the year-earlier mark, the Commerce Department reports . . . Manufacturers turned out 1,029,947 TV sets during the first two months of 1960 (vs. 896,518 in the like '59 period), Electronic Industries Association notes.

Corporations Have Record Working Capital

The net working capital of U.S. corporations (excluding banks and insurance companies) registered a net gain of $9.1 billion last year, to hit a record $128.8 billion at yearend, the Securities & Exchange Commission estimates. Inventories rose $6.1 billion during the year to a record $83.6 billion.

Two of Nine Plead Guilty in Price Fixing Case

Allis-Chalmers Mfg. Co. and I-T-E Circuit Breaker Co. pleaded guilty to government charges that they illegally conspired to fix prices of electrical

Technical Outlook—Page 107 Market Outlook—Page 135

power equipment and allot government business among themselves. General Electric Co., Westinghouse Electric Corp., and five other firms pleaded not guilty to like charges. The case concerns power switchgear assemblies and involves about $125 million.

Steel's Cost-of-Living Clause Is 'Coming Up Roses'

Steelmen haven't yet sent roses to the management negotiators for the contract they signed with the United Steelworkers last January, but more and more of them are applauding their bargainers for the clause that ties cost-of-living and insurance together. They figure that cost-of-living is now practically dead; any future demands for it can be countered with the principle that new cost-of-living liability shall offset new insurance costs. And the maximum to be given under cost-of-living is clearly defined—and practically noninflationary.

IAM Contract Indicates Labor Trends

The first major labor contract in the important 1960 negotiations in the aircraft and missile industry has been ratified by members of the International Association of Machinists. The two year pact at Republic Aviation Corp., Farmingdale, N. Y., provides: Wages—15 cents; cost-of-living—existing 6 cents incorporated into base rates, further hikes limited to 6 cents in two years; health benefits—liberalized at a cost of 1.5 cents an hour, IAM estimates; job security—employees transferred out of the bargaining unit lose seniority, an employee's permission is needed to change his job classification.

Our Nuclear Generating Capacity is Growing

The U.S. now has 350,000 kilowatts of nuclear generating capacity; another 670,000 kw is under construction, reports Willard E. Henges, president, Graybar Electric Co., New York (picture). The Commonwealth Edison Co. nuclear generating facility in northern Illinois went on stream last week; it'll reach full capacity (180,000 kw) this summer. The firm says it will generate sufficient power to supply the needs of a city of 200,000 persons. General Electric Co. is building the $45 million facility.

Bubbles: Answer to Year-Round Seaway Shipping?

The St. Lawrence Seaway probably could be kept open all year, but don't expect anything to be done about it in the near future. Most Great Lakes traffic, such as iron ore and grain, can be handled adequately during a short season. Some scientists believe the water route could be kept open at "reasonable" cost. One development uses bubbles. A paper company keeps its log storage pond open that way. Pipes are laid along the bottom and air is pumped through at 30 ft intervals.

Change Coming in Retirement Policies

Look for more companies to relax rules demanding retirement at 65. Several large firms have stretched the mandatory age to 68. And a survey of 28 corporations by *Industrial Relations News* reveals: 25 per cent have already instituted flexible retirement systems; another 25 per cent make frequent exceptions to retirement at 65. Expected shortage of 35 to 44 year old men in the sixties is forcing industry to consider retaining veterans.

PAs See Good Business

The Purchasing Agents Association of Chicago survey for March finds: Deliveries are faster . . . Prices are level . . . Inventories are being trimmed . . . Employment is stable . . . Production is up slightly . . . New orders are down slightly. A survey by the Purchasing Agents Association of Central New York finds 45 per cent expect a sales improvement in the next six months; only 11 per cent expect a decline.

Steelworkers Stay Far Ahead As Best Paid

Steelworkers won wage increases totaling $1.405 during the last decade (not counting the latest package), the American Iron & Steel Institute reports. Here's a comparison of average hourly earnings (fringe benefits not included) and total increases from January, 1950, to January, 1960:

Steel	$3.08	$1.405	Meat packing, wholesale	$2.62	$1.201
Electrical machinery	2.22	0.789	Tires & tubes	2.92	1.157
Motor vehicles & equipment	2.70	0.985	Mining—bituminous coal	3.24	1.307
Textile mill products	1.57	0.368	Mining—copper	2.50	0.915

Thermoelectric Refrigerator Passes Test

A 1-cu-ft thermoelectric refrigerator, built by Westinghouse Electric Corp., was used to store food by C. A. Metzger, Air Research & Development Command engineer, who spent a week inside an airtight space capsule. The refrigerator, forerunner of a commercial model to be introduced soon, has no moving parts.

Aluminum Aims for Bigger Cut of Packaging Pie

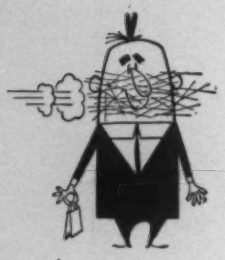
Aluminum packaging, a $180 million market last year, will be a $380 million market by 1965, Paul Murphy, vice president, Reynolds Aluminum Sales Co., predicted last week. He said about 700 million aluminum cans would be sold this year (using 50 million lb of metal)—nearly double last year's figure. Foil-polyethylene packages such as the Reynolds "boil-in-bag" will bring the consumer everything from hors d'oeuvres to crepes suzette in individual servings, Mr. Murphy predicts.

Tax Break in the Wind for Overseas Investors

Look for some revisions in proposed tax deferral legislation to encourage overseas business investment. Backers of the bill (Boggs bill—H.R.5) plan to

revise it so that it will apply only in underdeveloped countries. That will improve its chances for passage since Democrats criticized the first version for "giving too big a break to business." The Treasury Department likes the new version better, too.

Straws in the Wind



Baldwin-Lima-Hamilton Corp. has won a legal fight to apply the Buy American law to a $6.4 million, government contract for hydroturbines . . . Avco Corp. and General Electric Co. will build and operate pilot models of a plasmajet electric rocket engine for the National Aeronautics & Space Administration . . . Personal income in March hit a record annual rate of $393.5 billion (seasonally adjusted), reports the Commerce Department . . . Business failures rose 10 per cent in March to the highest level since May, 1958, notes Dun & Bradstreet . . . 1200 U.S. Steel Corp. prefabricated homes will be built at Howland, Ohio . . . A survey of building permits for the last six months shows Michigan, Pennsylvania, and California leading the nation in industrial expansion.

U. S. Lacks Economic Patriotism

J. Russell Clark, president, White Star Machinery & Supply Co. Inc., Wichita, Kans., told the American Machine Tool Distributors' Association last week that the "Buy American" approach to foreign competition is useless. "We are no longer nationality conscious when it comes to things we buy. American or foreign, if it will bend, punch, shape, or remove metal, the dollar sign may be the determining criterion for purchasing," he says.

Supersonic Air Travel Is on the Way

Supersonic craft for commercial airline operation will be available between 1965 and 1970, says North American Aviation Inc. The exact time depends on acceptable standards of comfort, safety, and cost. (Airframe and equipment developments could be ready for the first vehicle to fly in 1963, says North American.) Among the design requirements: Range of 3500 miles, cruising speed of Mach 2.5 to Mach 3 (1600 to 2000 mph), cruising altitude above adverse weather, operating costs of less than 3 cents a mile, and operation off runways 10,500 ft long.

Metalworking Pulse

Steel: The industry's operating rate rose nearly 3 points after declines for five consecutive weeks. **The Business Trend:** Steel's downtrend caused the industrial production index to decline another 3 points. Other business indicators held steady. **Autos:** Production moved up slightly from the Easter week level. A continuation of the late March-early April sales uptrend could strengthen assembly schedules.

• INDUSTRIAL PRODUCTION

Week ended Apr. 16 . . . . 165†
Year ago 169
Details on Page 83

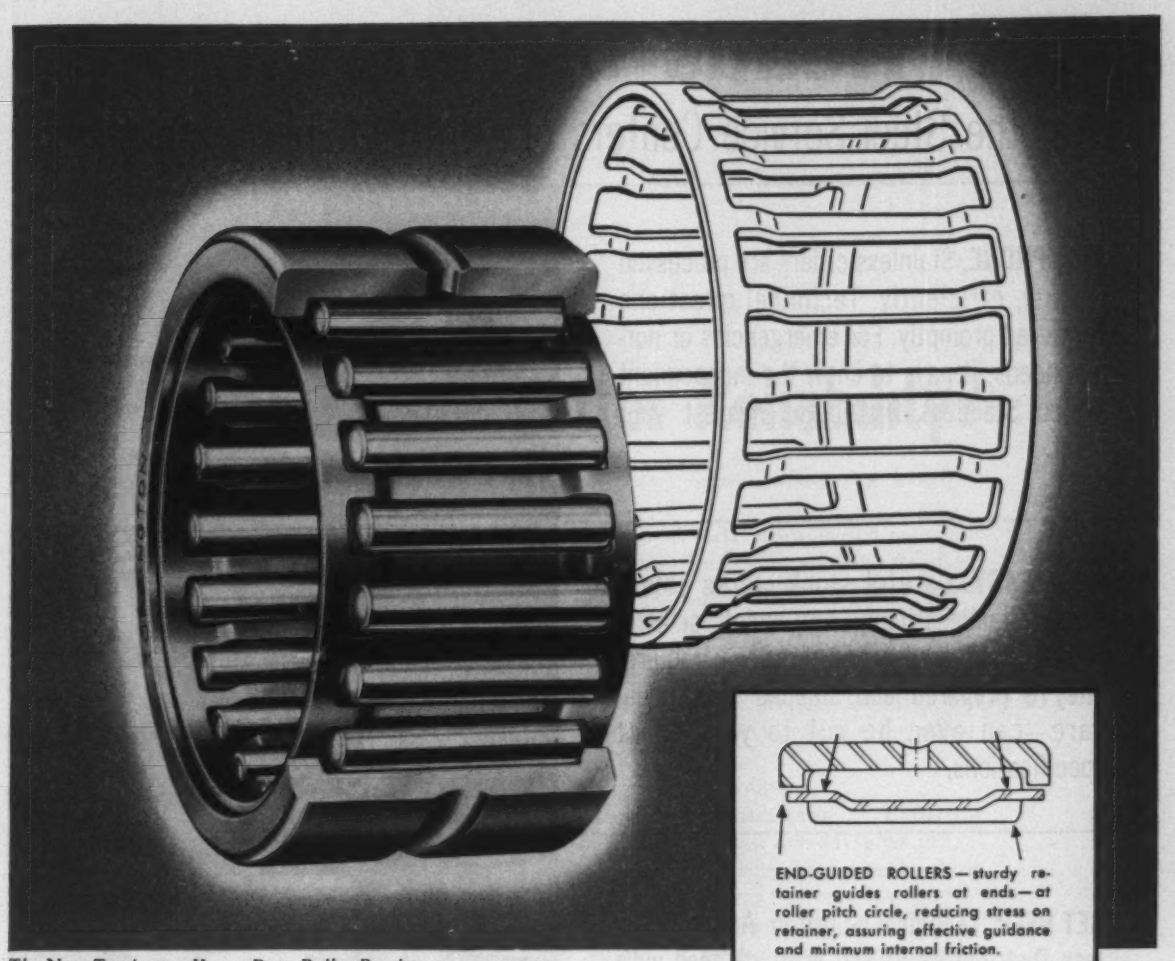
• PASSENGER CAR PRODUCTION

Week ended Apr. 23 . . 146,000*
Year ago 133,987
Details on Page 80

• INGOT PRODUCTION RATE

Week ended Apr. 24 . 80.9%†
Week ago 78.1%
Details on Page 144

†Preliminary. *Estimated.



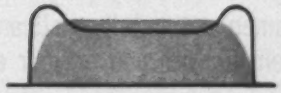
The New *Torrington Heavy Duty Roller Bearing*

Key to Long Life... Roller Guidance Where It Counts!

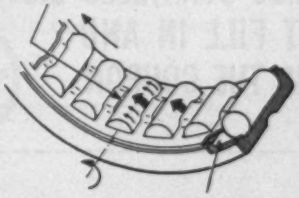
This sturdy flange-riding retainer in Torrington Heavy Duty Roller Bearings insures the highest degree of roller guidance where it's most effective... at the roller ends along the pitch circle. You get outstanding service life through minimum internal friction, high roller stability and efficient lubrication.

Controlled contour rollers prevent high end-stress concentrations. Careful heat treatment of the channel-shaped outer race insures high shock resistance. The Heavy Duty Roller Bearing has proved successful under unusual conditions of deflection or misalignment. Torrington Heavy Duty Roller Bearings are giving longer life in such difficult applications as two-cycle engines, hydraulic pumps, oil-field equipment, sheaves and transmissions. For design and application assistance on the Heavy Duty Roller Bearing—and every basic type of anti-friction bearing—call your Torrington District Engineer.

END-GUIDED ROLLERS—sturdy retainer guides rollers at ends—at roller pitch circle, reducing stress on retainer, assuring effective guidance and minimum internal friction.



UNIFORM LOADING—Torrington controlled contour rollers eliminate stress concentration at roller ends. End-stress pattern of unrelieved cylindrical rollers is shown in black outline. Area in gray shows uniform loading over entire contact length of Torrington rollers.



AMPLE LUBRICANT STORAGE AREA is provided by the retainer design, which also allows unrestricted flow of lubricant within the bearing.

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY Torrington, Conn. • South Bend 21, Indiana

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Anyone for Better Reliability?

One of our luncheon companions was late. Seems he had just bought a new auto and was having troubles.

"Darned thing won't reverse . . . apparently a loose screw in the automatic transmission. After we pushed it out of my garage, one of the windows fell down inside the frame and wouldn't come up. Probably a good thing though . . . gasoline fumes were pouring into the passenger compartment. I've been at the dealer's garage practically all the morning."

His plight reminded another colleague that he had purchased a car in the near-luxury group 14 months before. "I've had only 60 per cent use of it," he complained. "Forty per cent of the time it has been in the garage for adjustments and repairs."

The conversation suddenly became charged with emotion.

The next case history involved a brand name automatic washer. "Either the pump or the motor went haywire about every 31 days, just one day after the repair warranty expired. In a year, I paid as much for service charges as the thing cost in the first place."

We topped that one with the story of our dishwasher. The manufacturer used a plastic washer on the hot water intake. It cracked and water cascaded over the kitchen floor, causing the floor tiles to curl up at the edges like oysters in hot milk. The serviceman installed a metal washer for $12.67, said a few uncomplimentary things about the manufacturer (he'd had many similar calls), and left us estimating the damage to our kitchen.

Another unhappy member of the group had purchased a pot furnace for his plant. Heat went in the wrong direction from the indicator. After a lot of downtime, it was discovered the manufacturer had reversed two wires.

"And," chimed in another, "when they change the electrical systems on equipment, why do they put in old wiring diagrams that mean absolutely nothing?"

So went the luncheon.

The most disturbing comment was that such small, human errors and oversights in American products are too frequent to be funny. The implication was that our high-priced American workers turn out more shoddy work than lower-paid, foreign workers.

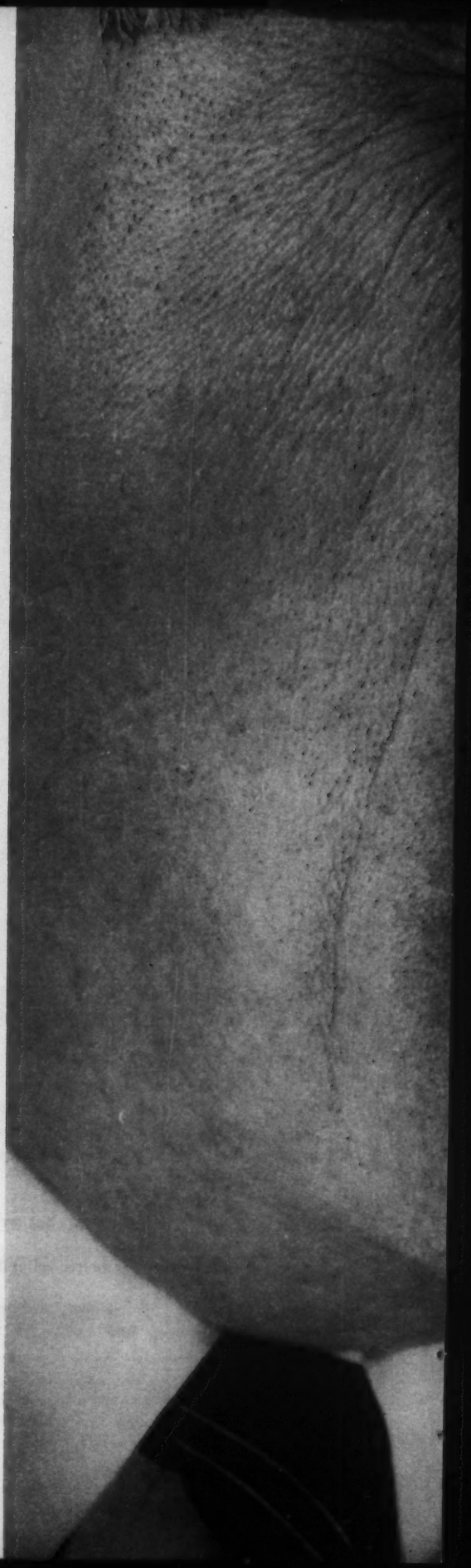
True or false?

We don't know. But we have sat in on such conversations many times. We bet you have too.

Anyone for better reliability?

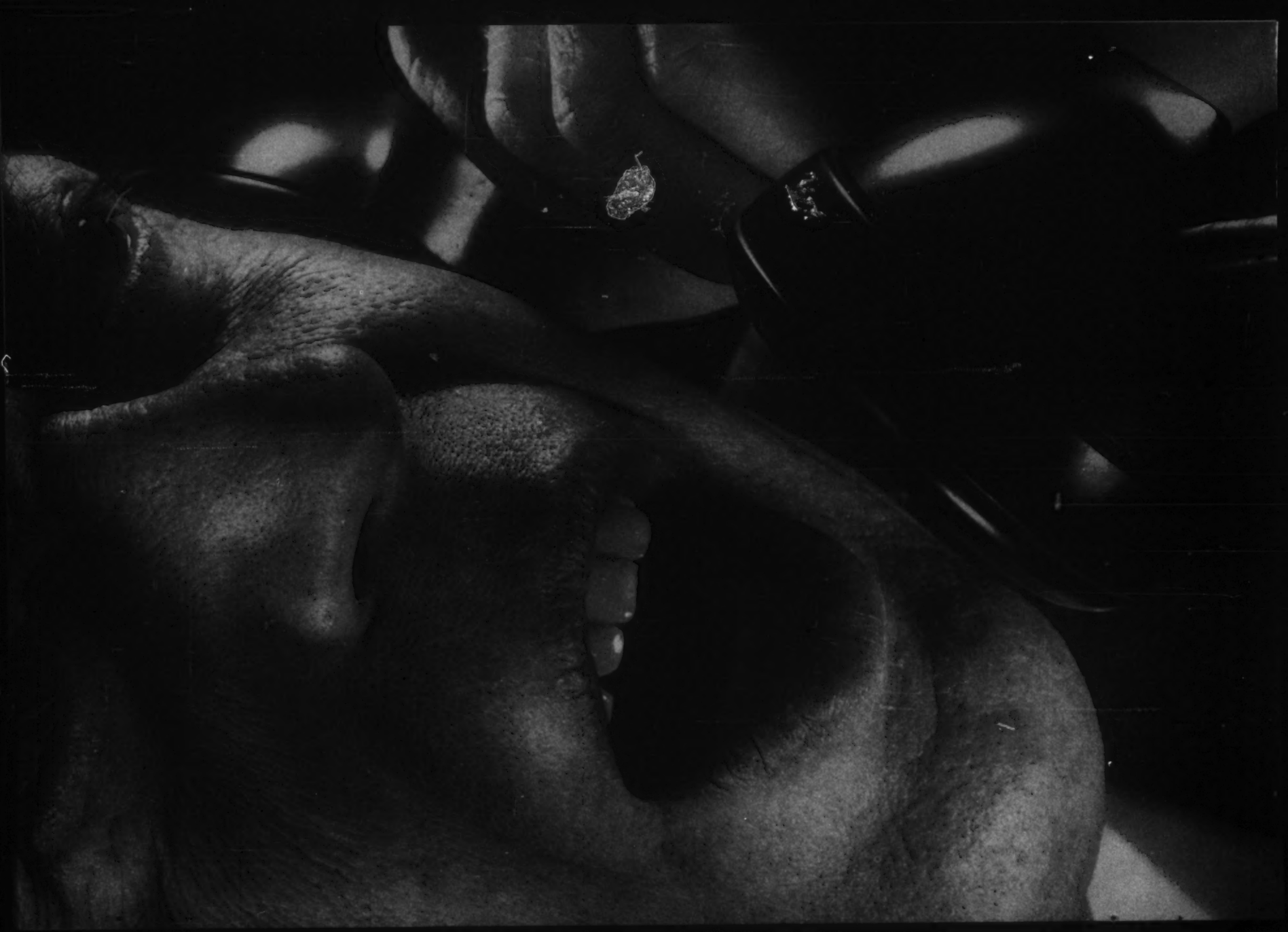
Walter J. Campbell

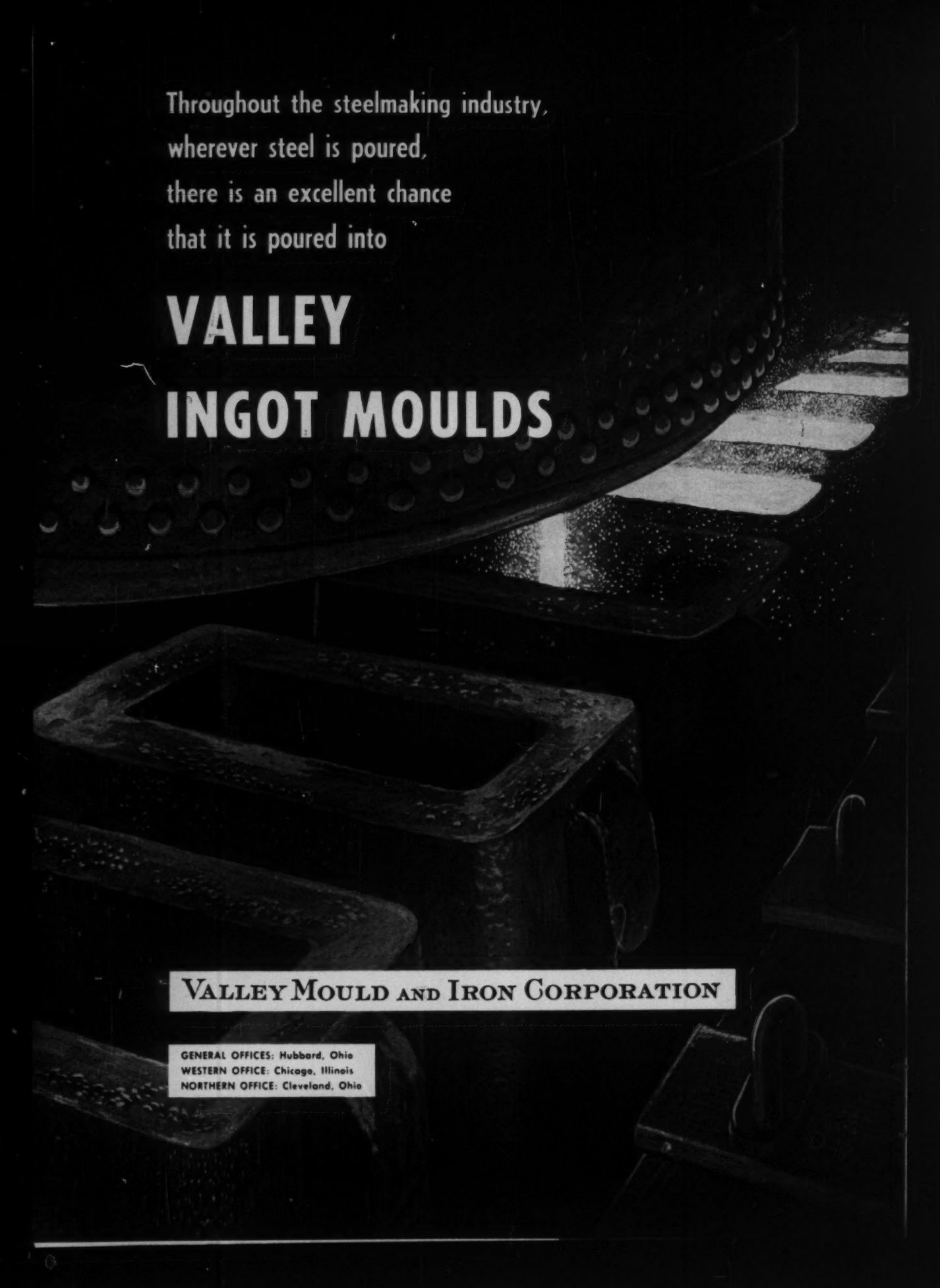
EDITOR



"...So then he tells me our company is too small to be one of their suppliers!"

This salesman is frustrated. So is his management. They have a good story on quality and price. They have plenty of other *facts* on their side. Yet they can't break down this buyer's resistance. And they won't . . . until they recognize the prestige factor among big-company-minded customers . . . understand the fears that make them shy away from small companies . . . realize that *facts* alone are not enough. For there is no such thing as a cold, rational, *industrial* buyer. He's a *human being* who buys on *emotions* as well as merit. STEEL's new depth study reveals an amazing variety of emotions underlying industrial purchases. It also contains specific suggestions on how to *use* these new findings to make your advertising and selling more effective. Ask your STEEL representative for complete details . . . or drop us a line. **STEEL Magazine, Cleveland 13, Ohio.**




Throughout the steelmaking industry,
wherever steel is poured,
there is an excellent chance
that it is poured into
VALLEY
INGOT MOULDS
VALLEY MOULD AND IRON CORPORATION
GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio

Lead, Zinc Prospects Look Good

PRODUCTION:
Up — but still in balance with consumption.

DEMAND:
Up — in zinc 10 to 15%; in lead 4 to 6%.

STOCKS:
Down in zinc; little change in lead.

PRICES:
Zinc should hold about where it is; lead may go up about 1 cent.

RESEARCH:
Some expansion of markets, a few new uses.

"THE FUTURE of zinc has never looked brighter than it does today." Those words of Howard I. Young, president of American Zinc, Lead & Smelting Co., St. Louis, sum up the feelings of industry leaders who believe the metal has suffered most of the bumps it's going to in the world market place.

Producers are equally enthusiastic about the long term future of lead but temper their optimism with cautions that some short term problems must be overcome.

• **Why They're Optimistic**—The big news in lead and zinc: World production and consumption are near balance for the first time in years. Producers all over the world are showing more moderation in release of the two metals. Expanded research and development are opening new Space Age markets, expanding old uses, and bringing new hope to the industry. Zinc stocks are going down and lead stocks are holding fairly level.

That doesn't mean the industry is without troubles. Producers in general contend the government system of quotas is "starving" this country of needed metal without protecting against lower priced imports. Considerable weakness still shows in some traditional markets, such as lead cable sheathing. Even with the vast improvement in research over the last few years, not enough funds are finding their way into the R&D

coffers. The industry still lacks aggressive market promotion.

• **Demand Curve Up**—Despite such problems, demand is on the way up. U. S. consumption of slab zinc rose from 868,327 tons in 1958 to 933,800 tons last year. The long steel strike itself cost the zinc industry 80,000 tons in lost sales, estimates J. L. Kimberley, executive vice president of the American Zinc Institute Inc.

This year, zinc sales will rise 8 to 19 per cent, depending on whose forecast you read. The average falls in the 10 to 15 per cent range (1,027,000 to 1,074,000 tons).

Lead consumption (primary and secondary) which rose from 986,387 tons in 1958 to 1,083,000 tons last year, is expected to rise 4 to 6 per cent. That would mean 1,130,000 to 1,148,000 tons in 1960.

• **Zinc Output Going Higher**—You can look for zinc production to take a fairly sharp climb this year. World producers voluntarily curtailed production in 1959 so surpluses overhanging the world market could be worked off. With the lifting of controls early this year, production of slab zinc in this country will probably jump to around 1 million tons compared with 858,000 tons in 1959.

Not so with lead. Because of the large stocks still in warehouses (168,000 tons in this country and 133,000 tons outside the U. S.), producers agreed to curtail marketing of lead until at least the end of September.

Lead stocks should hold their own or decrease in the U. S. over the year. Outside this country they may go up a little. Zinc stocks will definitely come down. At the end of January, U. S. slab zinc stocks dropped to 136,566 tons, marking the seventh straight month they fell.

Galvanizers, who consumed 346,648 tons of zinc in 1959, will do even better by the industry this year. Trade sources estimate that galvanized steel sheet production will jump to a record 3.5 million tons vs. 2,772,835 tons in 1959.

• **Automotive**—The most significant new market for zinc is galvanized steel sheets for auto body construction. Shipments are running 3000 tons a month and are expected to reach 6000 tons soon. The potential is 400 to 500 lb of galvanized steel in each car body, estimates Mr. Kimberley.

Uses of zinc for autos gained in 1960 models, mainly through an increase in the number of diecastings. Average per car: 69.4 lb of zinc vs. 60.5 lb in 1959 models.

• **Diecastings** — The diecasting industry consumed 325,150 tons of zinc last year, up 29 per cent from 1958, reports David Laine, secretary of the American Die Casting Institute. Particularly significant: A record 150,000 tons went into non-automotive applications.

Rolled zinc shipments hit a 70,000 ton a year peak right after World War II and now appear to have leveled off at around 40,000 tons annually. Marketmen believe the new zinc-titanium-copper alloy will give a tremendous boost to sales.

• **Batteries**—The storage battery industry will consume 342,000 tons of lead compared with 326,000 tons in 1959, predicts C. Herbert Allen, president of the Association of American Battery Manufacturers.

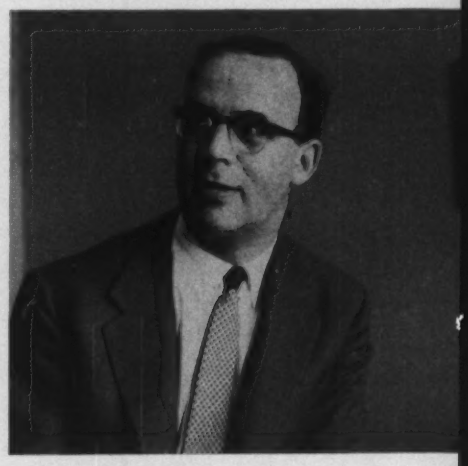
• **Tetraethyl Lead**—The estimated 71.4 million cars expected on the roads in the next four years will boost lead's second largest market. Nearly 67 billion gallons of gasoline will be consumed and it'll contain greater concentration of tetraethyl lead, says John S. Winthringham, Ethyl Corp.

• **Lead Goes Glamorous**—With a theme, "Look Ahead with Lead," and a research budget that has grown from virtually nothing to $750,000 in the last three years, the lead industry is making a strong bid to capture new markets. Particularly promising is sound and vibration control. Robert L. Ziegfeld, Lead Industries Association secretary, sees it becoming a 50,000 ton a year market within 5 to 10 years.

The zinc industry, with a budget that's been doubled in the last two years, is investigating such areas as welding galvanized steel, powder metallurgy for wrought products, and colored diecastings. Charles Ince, vice president-sales, St. Joseph Lead Co., calls the progress being made in solving diecasting plating problems and the new diecasting techniques such as vacuum casting one of the most significant developments in the industry today.

JEAN VUILLEQUEZ

SIMON D. STRAUSS



CHARLES R. INCE

Supply-Demand in Balance

LEAD AND ZINC are emerging from a condition of overexpansion and overproduction brought about chiefly by the U. S. stockpile program, says Jean Vuillequez, vice president, American Metal Climax Inc., New York, and president of the Lead Industries Association. "In 1959, for the first time in a number of years, world lead-zinc production was in balance with consumption. And this was achieved without large government tonnages."

• **Outlook for '60**—Things should be even better this year, believes Mr. Vuillequez. "Production and consumption will be in balance. Although the economic boom has not appeared as predicted, I look for demand for lead and zinc to go up around 15 per cent. Of course, part of this upswing will be a reflection of the consumption lost in 1959 as a result of the steel strike."

• **Looking Ahead**—The picture is equally bright over the long run, believes Mr. Vuillequez. Projected growth rates in consumption for both metals indicate the future need of increased exploration and the opening of new mines, he says.

• **Price Trend**—The greatest danger to stability rests in the U. S. market because of the system of quotas that restricts imports. Mr. Vuillequez terms the present 13 cents a pound price for zinc "good" and believes it won't vary too much over the foreseeable future. "The lead price is low at 12 cents a pound and is bound to go up (but not soon.)"

Market Stronger than Realized

"A GREATER CHANGE has occurred in lead and zinc's position than most people realize," believes Simon D. Strauss, vice president-sales, American Smelting & Refining Co., New York. "Just four years ago, the U. S. government was purchasing 200,000 to 300,000 tons of each metal yearly to balance Free World production and consumption."

• **Rapid Recovery**—"Yet here we are in 1960 with no government buying program, with equal or greater Free World production, and still zinc stocks will drop and lead stocks will just about hold their own. With foreign producers operating at near record capacity, it won't be too long until increases in global consumption will spur additional U. S. production."

• **The Future**—"I feel confident about zinc's future unless we get excessive government intervention. The present price is satisfactory to most producers. I would like to see the 13 cents a pound quotation maintained (in relation to the current dollar).

"The outlook for lead is a little more cloudy but barring any unexpected technological development that would affect major markets, the future looks quite good." The lead price may eventually go to 15 cents a pound, believes Mr. Strauss, but probably not this year. Possible: A 1 cent a pound rise (to 13 cents) over the year.

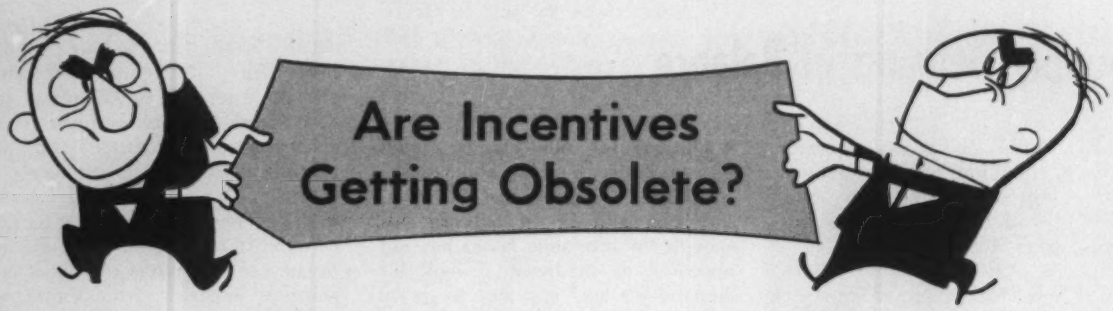
Tariff Could Stabilize Market

THE LONG TERM solution to stabilizing the U. S. lead and zinc market is a higher tariff on imports of foreign ores and metals, believes Charles R. Ince, vice president-sales, St. Joseph Lead Co., New York. "While opinion varies as to how much present duties should be increased, we now have an indication of Tariff Commission thinking in the figures suggested by the minority commissioners in their recent report to Congress (3 and 2.5 cents a pound respectively for lead and zinc pigs and slabs compared with present 1.06 cents and 0.7 cent.)

"With the right level of duties, a sufficiently wide differential could be established between U. S. and foreign prices to maintain domestic mine production at the administration objective of 550,000 tons a year for zinc and 350,000 tons for lead, yet still attract enough foreign ores and metal to take care of our needs."

• **Stockpiling Villain** — The world problem in lead and zinc, says Mr. Ince, stems from the U. S. government's stockpiling program which led to an overabundance of metal; uneconomic, subsidized production; and widely fluctuating prices when such artificial support was withdrawn from the market. "You can't fool with the law of supply and demand without suffering consequences."

• **What's Ahead**—"I look for an increase in zinc consumption this year of 8 to 10 per cent and in lead of about 4 per cent. The zinc price may rise to 14 cents a pound and lead to 13 cents by yearend."



YES

1. **Every man takes pride in his work and by nature wants to put in a full day's work for a full day's pay. He needs no additional incentive.**
2. **Technological advances make the machine set the pace, not the man. He can't make more by working harder.**
3. **Incentive programs are difficult and costly to administer.**
4. **Employees are always at odds with incentive systems, creating a heavy grievance load and king-size hassles with the union.**
5. **Incentives tend to encourage cheating by worker and foreman, throwing costs out of line.**

NO

1. **Every individual ought to have the opportunity to earn a reward for superior effort and performance.**
2. **Even so, employees must still tend the machines and will govern whether they operate at maximum efficiency.**
3. **They require no more cost or administration than any good management control system.**
4. **When incentives are properly set up, the individual has a personal reason for doing a good job. Fewer grievances occur, claim proponents.**
5. **That's because proper controls are not set up. The foreman should also be under an incentive to keep costs in line.**

Management Control Provides the Key

"EVENTUALLY YOU'LL have to pay the worker an incentive to get off his duff, walk over, and push the button."

That's the way one industrial relations executive answered the question: Are technological advances making incentive systems obsolete because the machine—not the individual—will be pacing the speed of production?

STEEL got answers on both sides of the fence and a lot of controversy over incentives vs. the measured day rate. (Many firms are switching from one method to the other.) We also came up with something of a surprise: Regardless of the method espoused, everyone agrees: Management can make or break a program.

• **One Side**—Staunch supporters of incentives include such firms as Warner & Swasey Co., Cleveland machine tool builder, and Massey-Ferguson Inc., farm equipment producer.

Says John Wolf, manager of Warner & Swasey's incentive standards department: "Every individual should have an incentive opportunity. It rewards the hard worker. Experience shows that employee performance over-all increases when you install incentives."

To the charge that incentive programs generate union grievance headaches, a Detroit firm answers: It depends on how the program's administered. It hasn't had a written incentive grievance in two years.

• **Other Side** — Thompson Ramo Wooldridge Inc. reports success in its

campaign (see STEEL, Feb. 22, p. 36) to encourage employees to put in a full day's work for a full day's pay. It dropped incentive programs shortly after World War II and adopted a measured day work approach.

Cleveland Consultant M. K. Sheppard feels that, in addition to changing technology, two other factors are contributing to the superiority of measured day work programs over incentive systems:

1. Unions have forced the bargaining element into incentives. This has necessitated compromises and too often has pushed incentives out of line, creating both inequities among workers and higher employment costs for the company.

2. Incentives are difficult to administer and police. Emphasis is focused more on pay and less on productivity, which tends to foster cheating by both employees and supervisors in their efforts to "look good."

Other reasons cited for eliminating incentives: It's difficult and expensive to keep standards up to date with product, tooling, methods, and equipment changes. It's difficult to determine who should and should not be covered by incentives. It's not fair to the employee to be subjected to wage fluctuations for factors not in his control, such as machine downtime and material shortages.

• **The Key**—Even though there is disagreement over the method of encouraging greater worker performance, both sides concur on this point: The success of either approach—incentives or measured day work depends as much or more upon management factors than the method of employee motivation.

Too much of the time, admitted one industrial engineering manager, there's more manager error than employee shortcoming behind poor performance:

- Poor stock flow.
- Material off specification.
- Worn equipment.
- Poor work scheduling.
- Poor placement of the individual in terms of aptitude and skill.
- Foremen neglect to instruct the individual on proper methods.

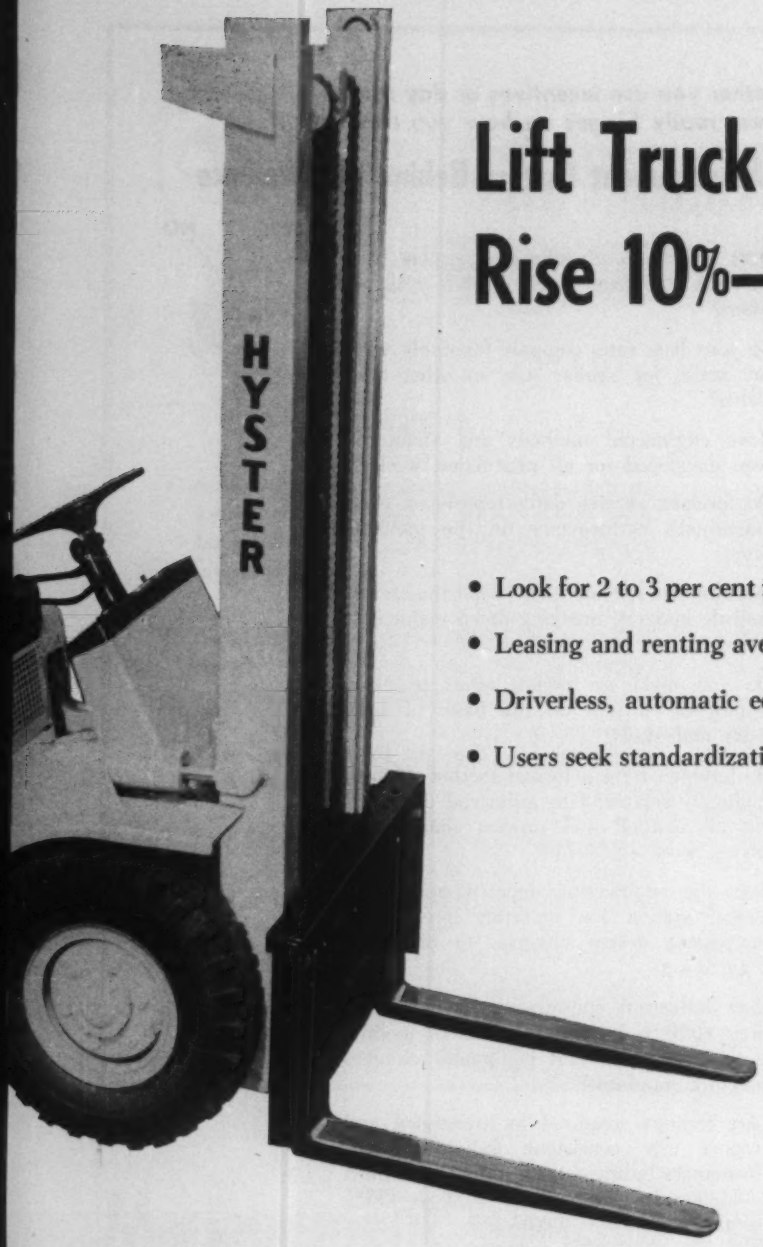
• **Why They're Changing** — Poor management control and administration are the underlying reasons why most firms are switching methods. Over the years, management has permitted factors affecting industrial engineering standards (tooling, methods, and product design changes) to deteriorate. Or it has cut the industrial engineering staff during recessions to the point where it couldn't keep standards up to date. Or it has compromised standards, incentives, or base rates as bargaining tools to gain other union concessions—with the result that inequities were created, and employment costs were pushed out of line.

• **The Secret**—The key man in any program is the foreman. If he has the right tools to do the job and management has established the proper checks to make sure he's doing it, a high level of performance can be maintained.

Whether you use incentives or day rates, success really hinges on how you rate on . . .

Management Factors Behind Performance

	YES	NO
1. Does your job classification system slot each job into proper relationship with all others?	____	____
2. Do your base rates compare favorably with pay scales for similar jobs in other area plants?	____	____
3. Have engineered methods and standards been developed for all production work?	____	____
4. Do foremen receive daily reports on each individual's performance on the previous day?	____	____
5. Do foremen operate their departments on realistic budgets, breaking down major cost areas?	____	____
6. Do you make an honest effort to place employees on jobs on the bases of aptitudes and skills?	____	____
7. Do foremen have a formal method for immediately reporting to industrial engineering all method and process changes affecting work standards?	____	____
8. Does the engineering department have a formal system for reporting product or component design changes to industrial engineering?	____	____
9. Does industrial engineering have a sufficient staff to keep pace with all tooling, methods, process, and equipment changes affecting standards?	____	____
10. Are foremen required to investigate and report any consistent individual performances falling outside prescribed limits —for example, below 85% or above 135% of the engineered standard?	____	____



Lift Truck Sales to Rise 10%—Best Yet

- Look for 2 to 3 per cent increase in prices.
- Leasing and renting averages 10 to 15 per cent of sales.
- Driverless, automatic equipment on the way.
- Users seek standardization.

IF CAPITAL SPENDING expectations materialize, industrial truck sales will increase about 10 per cent this year. Unit shipments are expected to top 40,000. The record: 38,900 in 1956.

The industry's backlog dipped at the turn of the year but is rising again. Clark Equipment Co.'s Industrial Truck Div., Battle Creek, Mich., reports 30 to 60 days, depending on the type of machine. Erickson Power Lift Trucks Inc., Minneapolis, is shipping in three to four weeks. Another firm reports 4 to 12 week backlogs.

• **Price Increase Likely**—There may be temporary price stability if the predicted boom loses some of its bang. Two producers, Minneapolis-Moline Co., Hopkins, Minn., and Baker Industrial Trucks Div., Otis Elevator Co., Cleveland, do not expect to boost their prices.

But the consensus among respondents to a STEEL survey is that an increase will come before the end of the year. Causes: Mounting labor and material costs. The hike will undoubtedly be small, say 2 to 3 per cent.

• **Imports Still Negligible** — One producer with plants in Europe and South America remarks: "Imports have not been particularly troublesome to us, although we are conscious of the merchandising efforts of overseas manufacturers." Another states that the power equipment business has been relatively

untouched but adds that a good percentage of the hand lift truck business has been captured.

The threat may not be too far off. Elwell-Parker Electric Co., Cleveland, says: "In our line (industrial trucks) we are not at this time seriously threatened by imports but believe that we may be in the next two years.

• **Leasing, Renting**—A prominent producer reveals: "Current interest in leasing or renting is obviously higher than it was several years ago. The tax angle doesn't seem to be as important as formerly, but the need for capital extension appears to have more importance."

Clark Equipment reports that about 30 per cent of its sales in 1959 were via leasing or renting. At the opposite extreme: Elwell-Parker's figure was 1 or 2 per cent. Leasing averages around 10 to 15 per cent for most firms.

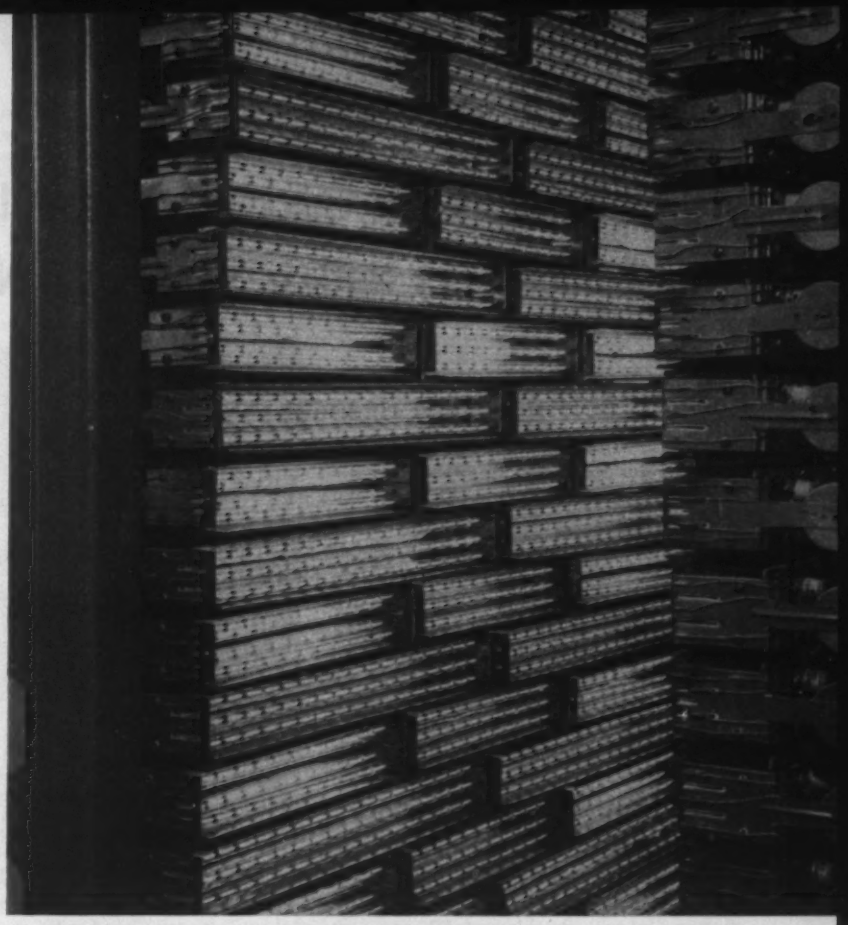
• **Future Trends**—Two factors stimulate emphasis on research and development: The high cost of warehouse space and advances in automated production.

Expensive factory space requires fuller utilization to lower costs. Higher stacking and narrower aisles are required. Equipment is being designed which lifts the operator to the work by remote control. Some equipment features side loading. Eventually, the electric truck industry will probably use fuel cells in place of batteries.

Trucks will be driverless, operating automatically through programed tapes or punched cards. Operators will manipulate some trucks by remote control.

• **What They Want** — Customers think the industry should do something about standardization. Examples: Mast heights, horns, and battery sizes. One automotive plant has already formed an industrial truck committee to formulate limited standards which would apply to its operations.

Users point out: Standardization would help immeasurably in planning storage areas with relation to aisle widths, height of stacking, inventory of maintenance parts, and provide a basis for uniform plant layout.



Radiant quartz lamps, which provide heat for Norair's brazing process, can be selectively controlled for panels of varying size and shape

Brazing Cut to Minutes

AN AUTOMATIC brazing process for stainless steel honeycombs, developed by Norair, a division of Northrop Corp., Hawthorne, Calif., does jobs in minutes that take 3 to 15 hours with present furnace methods. Called Nortobraze, the method has resulted in a $956,477 Air Force contract for the manufacture of advanced aircraft and space vehicles.

The contract, with the Manufacturing Methods Div., Aeronautical Systems Center, Wright-Patterson Air Force Base, Dayton, Ohio, authorizes the manufacture of honeycombs in a variety of sizes and shapes. The work will be done on automatic brazing machines.

• **How It Works**—One such machine has been operating for nearly two years at Norair. Brazing cycles range from 2 to 15 minutes, depending on the complexity of the panel. Banks of radiant quartz lamps provide heat up to 6000° F. Automatic controls are connected to sensing devices which send timing and temperature information from inside the honeycombs during brazing. Electronic sequencing, based on information received from the sensing devices, provides uniform time and temperature even when the part has nonuniform density.

In addition to stainless steels, the process has been applied to titanium alloys and is adaptable to metals in the columbium and molybdenum groups.

They are becoming prominent in the design of satellites and interplanetary space vehicles, reports Norair.

NLRB Rulings Come Quicker . . . Britain Likes Our Missiles . . . The Economics of Nuclear Ships . . . A Navy Market Expands

Congress Sets Aluminum Hearings

THE ALUMINUM industry will go before Congress again to discuss several matters related to small business. Rep. Sidney R. Yates (D., Ill.), chairman, House Small Business Subcommittee on Basic Metals, has called a secret session with the Justice Department and Federal Trade Commission officials for Apr. 27. On May 2, the subcommittee will hear from small business representatives, trade associations, aluminum producers, and automobile makers.

They will be questioned about hot metal contracts, mergers, expansion plans, relations with independent fabricators (there have been complaints about a "price squeeze"), and scrap exports.

NLRB Improves Its Efficiency

The National Labor Relations Board has cut processing time for unfair labor practice cases by 60 per cent in the last year—from 109 days to 43 days. The agency claims a backlog of 526 cases, as of last July 1, has been "virtually eliminated." Investigations are on a current month basis, with the whole procedure (from filing of the charge to completion of a hearing) taking no more than 90 days in almost all cases, only 45 days for 85 per cent of the cases.

Democrats Charge "GOP Normalcy"

The Democratic National Committee is making hay with the latest unemployment figures. The 300,000 rise brought the total to 4.2 million. The committee is trying to remind the voters that "unemployment was less than 3 per cent" when President Eisenhower was inaugurated.

The administration notes that March employment was over 64 million, an all-time high for the month.

Transportation Matters Concern Congress

Sen. Clair Engle (D., Calif.) is pushing a bill to provide assistance to state and local governments to improve mass transportation services.

Sen. Harrison A. Williams Jr. (D., N. J.) introduced the measure to give planning grants and low interest loans to metropolitan areas. Loans up to $100 million would be available.

The railroads are backing several bills in Congress which would permit them to diversify into air, trucking, and water transportation. . . Congress seems to be increasingly concerned about states which pass legislation diverting highway user tax revenues to "nonhighway" purposes like mass transit subsidies, school construction, and reimbursement of utilities for their cost in relocating facilities when new highways are built. . . Sen. Warren G. Magnuson (D., Wash.) says the U. S. should build at least 25 new merchant ships a year. (Nineteen contracts were let in 1958, 15 contracts in 1959.)

U. S. to Sell Missiles to Britain

Defense contractors for the submarine launched Polaris missile and the B-52 launched Sky Bolt will be getting new orders as a result of the new look in British defense policies. Britain has canceled its Blue Streak IRBM and will buy Polaris birds to be launched from mobile sites, similar to our planned facilities on railroads from the Minuteman. The British series of "V" bombers will be equipped with our Sky Bolt. In Washington, it is understood the French may be considering similar purchases of U. S. weapons.

Defense Notes: Contractors who did over $1 million worth of business with the U. S. in 1959 must file with the Renegotiation Board by May 1. . . Transit II, the Air Force satellite launched Apr. 13, had a second stage rocket made by Aerojet General Corp. with a restarting capability, a first in missile technology. The rocket "coasted" for 19 minutes, then restarted for 13 seconds to kick it into orbit.

Atomic Ship Costs Are Competitive

The Maritime Administration says capital costs of nuclear propelled vessels are 29 to 70 per cent higher than those of similar conventionally powered ships; operating costs (exclusive of fuel for the nuclear vessels) will be 25 to 54 per cent greater. But lower nuclear fuel costs and the capability of carrying increased cargo make the cost per ton of cargo carried only 3 to 24 per cent higher for nuclear ships.

Atomic Briefs: The Atomic Energy Commission will sponsor a series of courses on radioisotope principles and techniques for management and technical personnel in industry this summer at the University of California at Berkeley. Apply for further information from the Engineering & Sciences Extension, University of California, 2451 Bancroft Way, Berkeley 4, Calif.

More Antisub Equipment

Firms participating in contracts involving the Navy's antisubmarine program can expect some new business in fiscal 1961. Total expenditures have been increased about $900 million. Ship construction got the biggest boost—$762.3 million compared with $485 million in fiscal 1960. Cuts were made in aircraft and electronics budgets.

CREATIVE COST CUTTING

Selecting the metal to fit the job can give you surprising savings in total cost

Small spring clips between telescoping parts of auto radio antennas must maintain electrical contact, hold parts firmly, give smooth sliding action. Brach Manufacturing Division of General Bronze Corp., Newark, N. J., found that spring clips of Duraflex®, Anaconda superfine-grain phosphor bronze, gave best positive electrical contact and improved smooth action in Brach Auto Antennas over original clips made of premium metals. The clips stand up in constant use, spot welding and fabrication are easier—and costs are about 25% lower.

In this G-E Automatic Coffee Maker control, a thermostat turns cam actuating switches—for high heat to brew coffee, for low heat to keep it warm. At first, upper switch element was an assembly of blade, bushing, and locking nut. Tinnerman Products Inc., Cleveland, Ohio, engineered a one-piece Speed Clip to replace it—by forming one thread in the blade and two prongs to lock the screw (see inset above). This simplification called for a superior phosphor bronze. Tinnerman found it in Duraflex, Anaconda superfine-grain phosphor bronze. It has higher tensile strength and endurance limit for long-lasting dependability—greater formability for economical manufacture. The result: unit costs were cut— and G-E assembles controls faster, more easily. 6045

Quality control and cost reduction can go hand in hand. The secret is often simply matching the metal to the job. And Anaconda specialists, starting with 98 standard alloys, can offer an almost unlimited number of combinations of useful properties. For creative help in meeting your problems, write The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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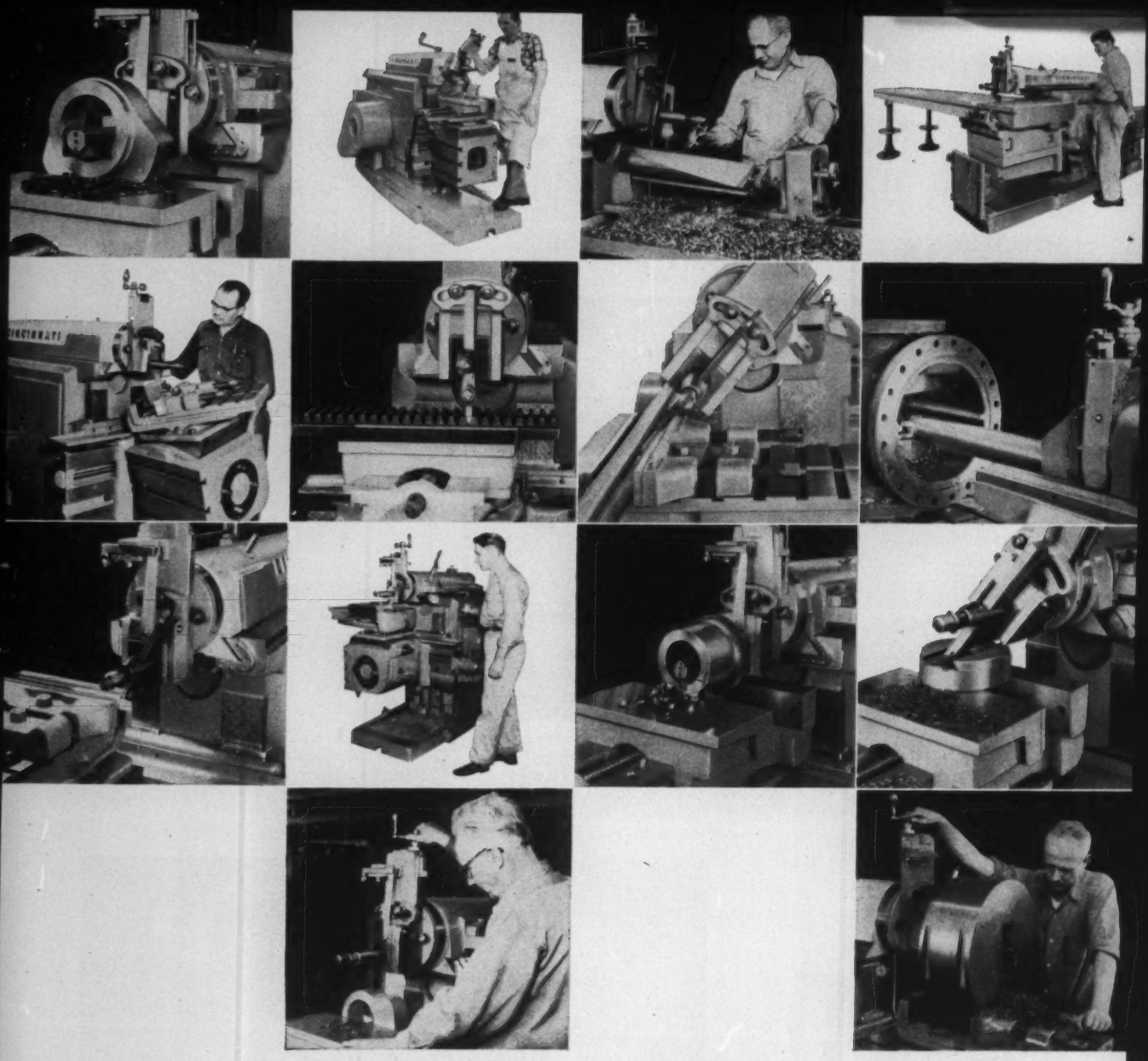
Made by The American Brass Company



PAYOFF: VERSATILITY

In the tool shop or in your high production bay, the wide-ranging versatility of a Cincinnati® Rigid Shaper gives you maximum productivity for your invested dollar. And for each of the many jobs you can do on it, a Cincinnati Rigid Shaper produces something extra – in metal cut per hour, in accuracy, in ease of operation. See for yourself why a new Cincinnati® Shaper would pay off for you: write Dept. C for Catalog N-7.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO. Cincinnati 11, Ohio, U.S.A.

British Steel Industry Hits 98 Per Cent of Capacity
French Revive Monorail Interest . . . Japan Steel Gains

Common Market Production Rising

(1953 = 100)

	Metalworking	All Industry
West Germany	190	166
France	170	158
Netherlands	165	144
Italy	155	160
Belgium	132	119
Luxembourg	—	126

Source: European Community Information Service.

Watch for Improved 'Inner Six' Efficiency

GREATER efficiency can be expected from European Coal & Steel Community nations as they make export agreements with outside countries, foster trade among member steel producing areas, and weed out (through mergers or other administrative action) inefficient plants. That's the opinion of Louis Lister, author of *Europe's Coal & Steel Community: An Experiment in Economic Union*. The study was done for the Twentieth Century Fund, New York.

Mr. Lister states that the Community is behind the U. S. in output per manhour, but "is as efficient as it needs to be" now and could catch up to American productivity rates within 20 years. He figures the U. S. has a 2.5 to 1 advantage, but concedes "it is more than compensated by lower wage rates."

The Community has fallen short of its major goals, reveals Mr. Lister, because of the unwillingness of member nations to support a central authority. However, he adds, the addition of new economic communities in Europe may provide the push toward a more integral type of federation.

Looking ahead, Mr. Lister guessed that the "rigidity of prices" in the Community and higher U. S. prices would restrict our steel exports to times of excessive demand.

Far East Steel Hurts Belgian Exports

The Belgian steel industry reports a slackening of new orders in the export market—especially in the Far East where Japanese competition is growing. Demand is still good for sheets, merchant bars, wire rods, and deformed bars. But heavy plates, sections, and other rolled products are slow. The domestic market is firmer than the export market.

Big Demand Pinches British Steel

The British steel industry is bustling at 98 per cent of capacity. Some increase in production is expected toward the end of the year as new plants are brought into operation. And if the English automakers continue their present pace, they'll consume all the additional output.

Consumers are stockpiling when they can to replace depleted reserves. The present inventory is about 2.5 million tons.

Pig iron reserves have fallen nearly 400,000 tons in the last six months, emphasizing the need for more blast furnace capacity.

French Introduce New Monorail

Eighteen French enterprises have collaborated in the introduction of a new streamlined monorail transit system. Object: Beat the urban transportation problem. The cars, suspended from an enclosed monotrack, can carry 123 passengers at speeds of 60 mph. Among the enthusiastic spectators at the first public demonstration was Mayor George Christopher of San Francisco. The mayor said the system was the sort of thing he had in mind for San Francisco and suburbs.

The track is a hollow, electrically welded, Martin steel beam. The cars, powered by two traction motors, are made of aluminum.

The complete cost of the elevated runs $2.5 million to $3 million per kilometer (about five-eighths of a mile) vs. $14 million to $20 million per kilometer for conventional subway lines.

Hungary Plans Steel Exports

By the end of the current five year plan in 1965, Hungary expects to be exporting 50,000 tons of thin steel sheets annually. Currently, it imports nearly 80,000 tons yearly. The increase will come from new hot and cold rolling mills which will start operating this year at the Danube Steelworks in Sztalinvaros.

Frankel Co.: Scrapman's Apothecary Shop

PROCESSING SCRAP piece by piece sounds like an expensive way to make a profit, but to Frankel Co. Inc., Detroit, it's the only way to guarantee analysis of exotic metal products it sells to electric furnace outfits and other companies that produce special alloys.

Frankel became interested in alloys in the early 1930s when stainless usage blossomed. As producers began turning out more grades of stainless, they also began to generate more scrap, but few scrapmen knew how to identify, sort, and process it. Frankel started to find out how to segregate and identify the alloys without remelting so they could be re-used. Since then, it has advanced to more complex alloys and exotic metals.

• **Guaranteed** — Explaining the process, Tom Towler, general sales and production manager, says: "We take the exotic scrap materials and through inspection, segregation, and testing turn them into our own product we call Vitamet. All materials are prepared to customer specifications, based on chemical analysis and size. The different scrap items are usually processed as solids, castings, or chips. In all products, analysis is guaranteed on every shipment."

Such quality processing requires special techniques. Frankel has adapted basic types of testing and

segregation equipment to meet its needs. It also works closely with equipment builders in the development of new types of equipment.

● **Example**—Titanium chips are one of Frankel's volume products. Turnings arrive in lots ranging from a few hundred pounds to many tons. They're usually contaminated with other alloys and cutting oil compounds. Each lot has to be identified and crushed before further testing. Trained workers hand sort the pieces and use a series of chemical and electrothermal tests to determine alloy types and content.

After chips are identified and crushed, they are thoroughly cleaned in a vibrating degreaser to remove all traces of cutting oil, greases, and fines. Other contaminating metal particles like tool bits are removed by special magnetic equipment as the chips are conveyed to an electronic checker where they're visually inspected before packaging.

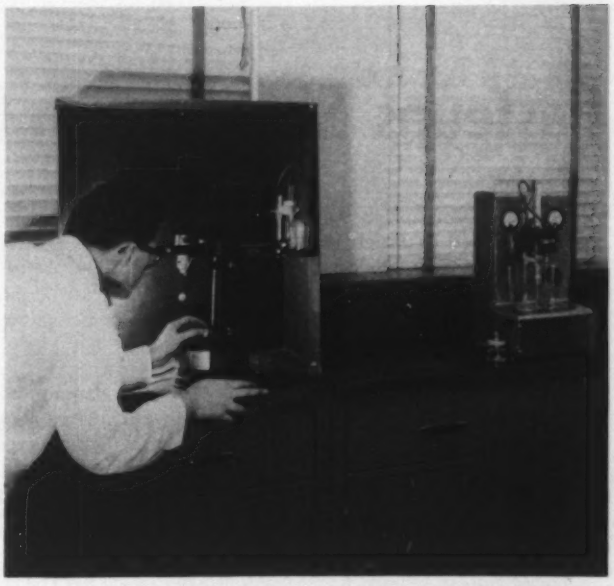
● **Research**—Besides titanium, the company handles zirconium and tungsten alloys, plus molybdenum, nickel, cobalt, chromium, columbium, and tantalum. Mr. Towler regards Frankel's chemical laboratory as the nerve center of its quality control program. "We probably are the only scrap firm that maintains a laboratory for basic research. It's surprising how little work has been done on positive, quick methods of metal identification. With all the complex alloys being produced today, identification has become more vital than ever before if the melting industry is to be able to use these types of scrap."

The lab is also working on methods to recover metal from various types of alloy scrap. If its efforts are successful, Mr. Towler believes many valuable elements that would otherwise be lost can be made available to industry.

Have You Entered?

See Pages 5 and 6.

From the scrap pile back to usable metal of guaranteed analysis. These are titanium chips, packaged in barrels



The segregation of alloys and grades is the heart of the business. Some tests can be done chemically in the plant; others are done in the lab

How Ledex Saves Drafting Time

1. Draftsman selects preprinted artwork from general file, draws extra views or alterations as needed.
2. He adds information on variables to preprinted drawings or fills in blanks in preprinted specification notes.
3. Project engineer checks preprinted forms for accuracy, initials and sends them to Xerography operator.
4. Operator trims and mounts forms in standard layout. Image is transferred and fused to standard drawing vellum.
5. Finished drawing and dismantled parts are returned to project engineer. Usual elapsed time: 1 hour.

Pasteups Simplify Drafting

A NEW SYSTEM of pasteup drafting has slashed as much as 90 per cent from the time needed to make original engineering drawings at Ledex Inc., Dayton, Ohio.

With the aid of Xerography and preprinted standard artwork, Ledex draftsmen are turning out new drawings in 1 hour that once took 8 to 16 hours. Ledex says it is handling 15 per cent more work with 40 per cent less manpower.

The producer of rotary solenoids, circuit selectors, hermetically sealed relays, and Syncramental stepping motors supplies equipment to the electronic, aircraft, and missile industries. Since most applications start as prototype orders, requiring special designs, the firm found that engineering drawing time was one of its most critical cost factors. Its solution: The use of preprinted artwork that can be pasted in as components of new systems and assemblies.

• The draftsman no longer wastes time redrawing standard segments for each new design.

After establishing his requirements, he checks a general file for artwork that meets requirements or calls for only slight alteration. If, for example, a circuit diagram is needed, he adapts a preprinted form by simply adding variable information. For specification notes and title sections, the draftsman uses printed copies by adding information in the applicable blanks.

After parts are checked for accuracy by a project engineer, they go to the Xerography operator, who trims and pastes them up in a standardized arrangement. The pasted up drawing is then photographed, transferred, and fused to drafting quality vellum.

• The new drawing is usually back in the hands of the project engineer within an hour after the draftsman starts reviewing his files.

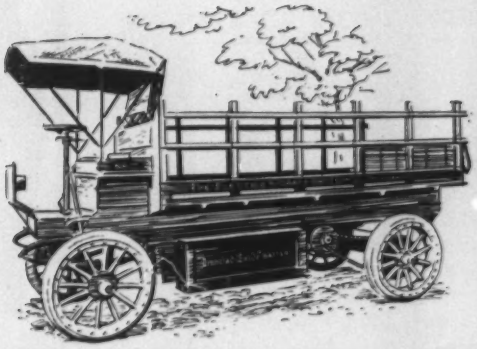
Further revisions in finished drawings are easy to make; new figures can be entered directly on the new drawing, or revised pictorial matter can be added and a new composite picture made.

Along with important savings in engineering time, Ledex reports the new system has cut filing and reproduction costs and speeded up deliveries of designs and customer orders.

LEAD

Sparks A

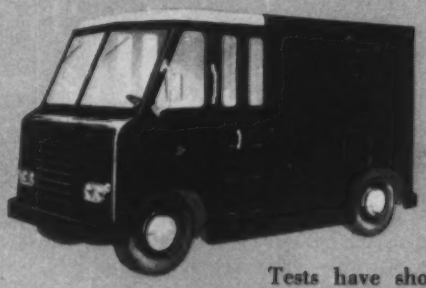
RENAISSANCE



Lead Storage Batteries

Provide *Practical Power*

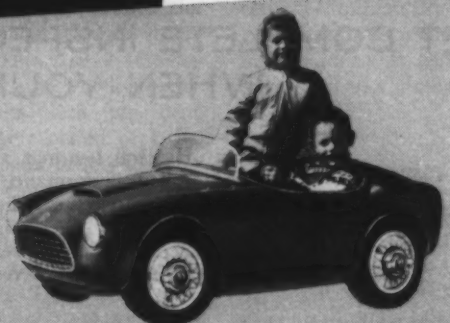
For Trucks, Cars and Toys



Tests have shown that this Cleveland Vehicle Company's Electric Delivery Truck for stop-go routes saves up to 50% operating costs . . . up to 55% upkeep costs . . . up to 50% insurance costs.

This is the lead-acid battery powered "Charles Town-About." Low operating cost and upkeep make it the ideal "second" car.

Look Ahead With ***LEAD***



"BABY FERRARI" Bimbo Racer 12, exact miniature of the Ferrari Italian sports car, is powered by a standard 12 volt lead auto battery, runs at 5 to 7 miles per hour, climbs 20% grade, operates five to six hours continually before recharge. Built-in recharger uses regular house current, recharges overnight.

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YOU GET COMPLETE INSPECTION WHEN YOUR "SPECS" READ HYATT

Hyatt Hy-Roll bearings are constantly checked through every stage of production. But performance is the payoff. And, that's why Hyatt insists . . . without exception . . . that every metric series Hy-Roll bearing be run on a special fixture to check noise level as a final test for quality. It's another of the many secrets of Hyatt reliability. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT HY-ROLL BEARINGS

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

Detroit Drives for 6.4 Million Sales

	SALES†	PRODUCTION
1960*	6,380,000	6,450,000
1959	6,026,500	5,599,496
1958	4,650,313	4,247,371
1957	5,982,342	6,120,029
1956	5,955,248	5,806,756
1955	7,169,908	7,950,377

†Denotes dealer registrations, not factory sales.
*Anticipated.
Source: Automobile Manufacturers Association.

Spring Sales Start to Bud

RETURN of a strong spring sales boom has brought Detroit economists out of the registration pits. They're souping up their forecasts and again are predicting a year that will be second only to 1955's 7.2 million sales. Best private guesses now center around 6.3 million to 6.4 million sales, plus 400,000 imports.

Not all the forecasters agree. Robert Eggert, Ford's market research manager, claims 6.2 million is his sales estimate for domestic cars. Edward N. Cole, Chevrolet's general manager, still talks about 7 million registrations.

Regardless of the discrepancies, the revival shows up in ten day reports which have reflected a constant rise since mid-March. The first third of April saw the industry averaging 20,000 sales daily. Expectations are that the second ten days will jump farther toward the record 26,000 mark. *Ward's Automotive Reports* says Apr. 1-10 sales totaled 160,420 units which pushed year-to-date sales 12.8 per cent ahead of the same period of 1959.

First quarter sales have added up to 1.6 million compared with 1.4 million last year and 1.5 million in record 1955. Don't forget that almost 100,000 of this year's registrations are imports. That makes sales of U. S. built cars equal to 1955's first quarter.

Even though sales are starting to move after a slump, metalworking is acutely aware that production still lags behind the first quarter pace. The industry built 2 million cars in the January-March period compared with 1.6 million in that period last year. High year-end dealer stocks and slow initial sales have pushed inventories to a near record 1 million units. Result: Second quarter buildups have been revised downward to 1.7 million cars, which is 13.4 per cent below the first three months and less than 3 per cent ahead of last year's second quarter. Motordom figures that if sales continue to average 20,000 units daily, it can cut inventories to half a million by July 1.

To metalworking that means basic steel buying is over until July when carbuilders will return to the market to order materials for the 1961 model run. Mills haven't shipped all the steel, of course. Some deliveries have been pushed back to keep pace with production cuts, but buyers now report that most future shipments will be spaced out through the spring and early summer.

In the first two months of this year, mills shipped 3.6 million tons of finished steel and forgings to vehicle manufacturers and their suppliers. That equals 22.3 per cent of total mill shipments. In the same period last year, the auto industry received 2.9 million tons of steel (23.8 per cent). That percentage is higher than autodom's traditional 20 per cent share. On that basis, it looks like automakers will receive 17 million tons of steel this year if mills ship their predicted 85 million tons. It would be close to the record 18.7 million tons Detroit used in 1955.

Compacts Hot

This forecast may be slightly high, however, because of the growing number of compact cars which use ¼ ton less steel than the average standard automobile. *Ward's* says makers of the six U. S. built compacts are planning on a first half buildup of 1 million units. They'll take 31 per cent of April-June production vs. 23.7 per cent of January-

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First Quarter Production

(Hundreds of units)

	1960	1959
Cadillac	50,130	46,117
Imperial	5,862	6,069
Lincoln	7,534	8,949
Thunderbird	22,731	18,461
Chrysler	27,540	18,728
De Soto	12,769	15,418
Buick	89,118	87,791
Oldsmobile	115,646	114,671
Pontiac	127,792	115,952
Mercury	55,031	44,353
Dodge*	111,335	41,899
Chevrolet	500,559	411,937
Ford	310,124	380,261
Plymouth	89,643	95,683
Rambler 6-8	96,057	76,368
Comet	17,553	—
Falcon	126,133	—
Corvair	93,880	—
Valiant	71,586	—
Lark	34,625	50,076
Rambler American	36,602	23,890

*Includes standard Dodges and Darts.
Source: *Ward's Automotive Reports.*

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,757
February	659,323	478,484
March	652,518	576,085
3 Mo. Totals	2,000,572	1,600,326
April		578,825
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

Week Ended	1960	1959
Mar. 19	145,852	135,466
Mar. 26	137,385	121,832
Apr. 2	147,830	133,878
Apr. 9	133,460	133,202
Apr. 16	140,160†	135,934
Apr. 23	146,000*	133,987

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

March output. Remember that four more compact cars will be introduced this fall, virtually assuring the industry of 1.8 million compact sales during 1960. That's the current sales rate of the six models now on the market.

Ford's Falcon still is front runner among the compact cars introduced this model year. It's pushing Rambler closely and may outstrip it saleswise by the end of the calendar year. Ford's other entry, Comet, also is hot. It's picked up 10 per cent of the compact sales since mid-March introduction. Lark is taking a slight licking. First quarter output dropped from 3.13 to 1.73 per cent of total industry production.

To insure compact sales success, Detroit is collecting more dealers to push the smaller cars. Last year, Rambler and Lark had 5300 dealers. This year, the six compacts are being marketed through 23,300 franchised outlets. It's expected that about 31,000 compact car dealers will be signed up for the 1961 selling season. That's almost 70 per cent of total industry dealerships.

Imports Drop

As predicted, the smaller U. S. built cars are slicing into sales of the more expensive imports. Captive imports, manufactured overseas by U. S. firms, show the biggest decline. Comparing first quarters, GM's Vauxhall has posted a 33.7 per cent sales slump. Chrysler's Simca is off 52.9 per cent. Taunus is down 42.2 per cent and the English Ford down 17.4 per cent. Other imports show smaller losses.

Renault and Volkswagen, however, continue to chalk up gains. These two less costly cars make up 45 per cent of all import sales. Renault knocked off 21,475 sales in the first quarter for a 17.5 per cent hike over the similar 1959 period. Volkswagen jumped from 14,000 to 23,000 registrations in January and February alone (March figures aren't available).

American Motors' Metropolitan is another exception; first quarter sales are up from 2716 last year to 3421 this year.

Success of Renault, Volkswagen, and Metropolitan lends credence to autodom's belief that there is still an untapped market for domestically built cars that are even smaller and less expensive than Falcon and Valiant size vehicles.

Needless to say, compacts aren't winning all their sales from imports. Only 6 to 10 per cent of Big Three compact sales are coming from foreign makes. Some reports have it that 15 to 25 per cent of the Big Three's compact sales are being won from standard Fords, Chevrolets, and Plymouths. Another 40 per cent comes from other domestic makes. Between 30 and 40 per cent of the buyers are wooed away from used car lots. As expected, that has softened the used car market. Average used car auction prices through mid-April are $1053 against $1092 for the same period last year. Dealers report some strengthening in sales volume and in prices in the last ten days.

Britain Exports Two More

British carbuilders have introduced two more compacts on the U. S. market. Triumph Motor Co.'s Herald features a sectional body. Rootes Motor's Hillman Minx sedan comes with an automatic transmission as standard equipment. Each car carries a New York port of entry list price of $2000.

The Triumph Herald is already a success in Europe. It goes on sale in this country next month. Built on a 91.5 in. wheelbase, the car has to be lubricated only once each year.

It has independent four wheel suspension and a steering column which telescopes on impact to prevent driver injury.

Instead of unitized or frame and body designs, the Herald has seven body sections, each of which is bolted to the chassis. The arrangement makes for less expensive repairs and has won a 12 per cent reduction in insurance premiums in England.

The Hillman Minx sedan, offers a three speed automatic shift and a heater as standard equipment. The transmission is fluidless. It uses magnetic iron powders as a coupling agent. Company engineers claim the design eliminates slippage during shifting, which makes for no loss in engine power or gasoline economy.

PRODUCT INFORMATION

NEW LAND-RIDING SEAL (Crimped)

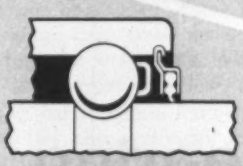
N/D's newest seal design. Efficient single lip, low-torque seal protects against moist or dry contaminants. Retains bearing lubricant-for-life. Recommended for farm implement discs, idler pulleys, wheels and similar applications. Available also with metal trash guards to protect seal against mechanical damage from trash windings.

NEW LAND-RIDING SEAL (Pressed) and SENTRI-SEAL

This exclusive seal combination is available in N/D's new heavy-duty conveyor ball bearings. Land-Riding seals, especially resistant to moist contaminant penetration, are available separately in N/D's bearings for hay rake tine bar, plow, hiller and coulter applications. Tandem seal arrangements are also available.

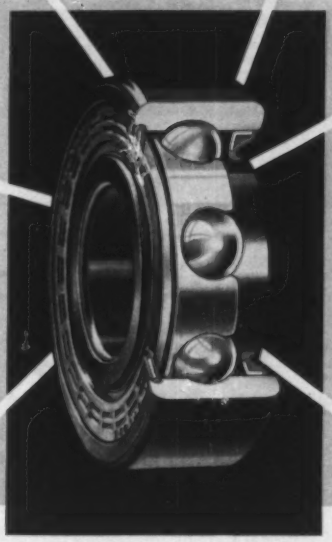
NEW SENTRI-SEAL

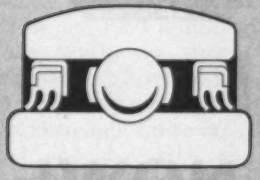
N/D's most versatile seal . . . available in most single row, non-loading groove and small double row N/D ball bearings. N/D Sentri-Seals are recommended for applications with moderate to severe contaminant conditions as found in light duty discs, idler pulleys, cam followers, implement wheels, adapter bearings and similar applications.



NEW DOUBLE "O" SEAL

N/D's most original seal design, used in fan and water pump bearings where water seepage is prime source of bearing contamination. Synthetic rubber seal rides smooth shaft O.D., offers reliable low-torque sealing and eliminates relubrication.





NEW TRIPLE LIP SEAL

N/D's most rugged seal . . . used where moist and dry contaminant conditions are most severe. Seal eliminates relubrication maintenance. It's available in N/D square and round bore ball bearings with either spherical or cylindrical O.D.'s.

N/D Introduces 5 New Integral Ball Bearing Seals!

Now, New Departure offers a versatile line of new integral seals for N/D precision ball bearings. Each N/D seal is engineered to retain bearing lubricant for life . . . and offer maintenance-free service. These seals are designed to give manufacturers a broad selection to choose from for a specific application.

Modern design N/D seals are made of synthetic rubber with supporting steel components for precise control of sealing lip flexibility and torque. Whatever the application, you'll find an N/D integral seal and ball bearing to fit it. All seals are available in popular sizes of New Departure ball bearings.

Write today for N/D's Integral Seal Bulletin. For detailed information, contact the N/D Sales Engineer in your area. New Departure Division, General Motors Corporation, Bristol, Connecticut.

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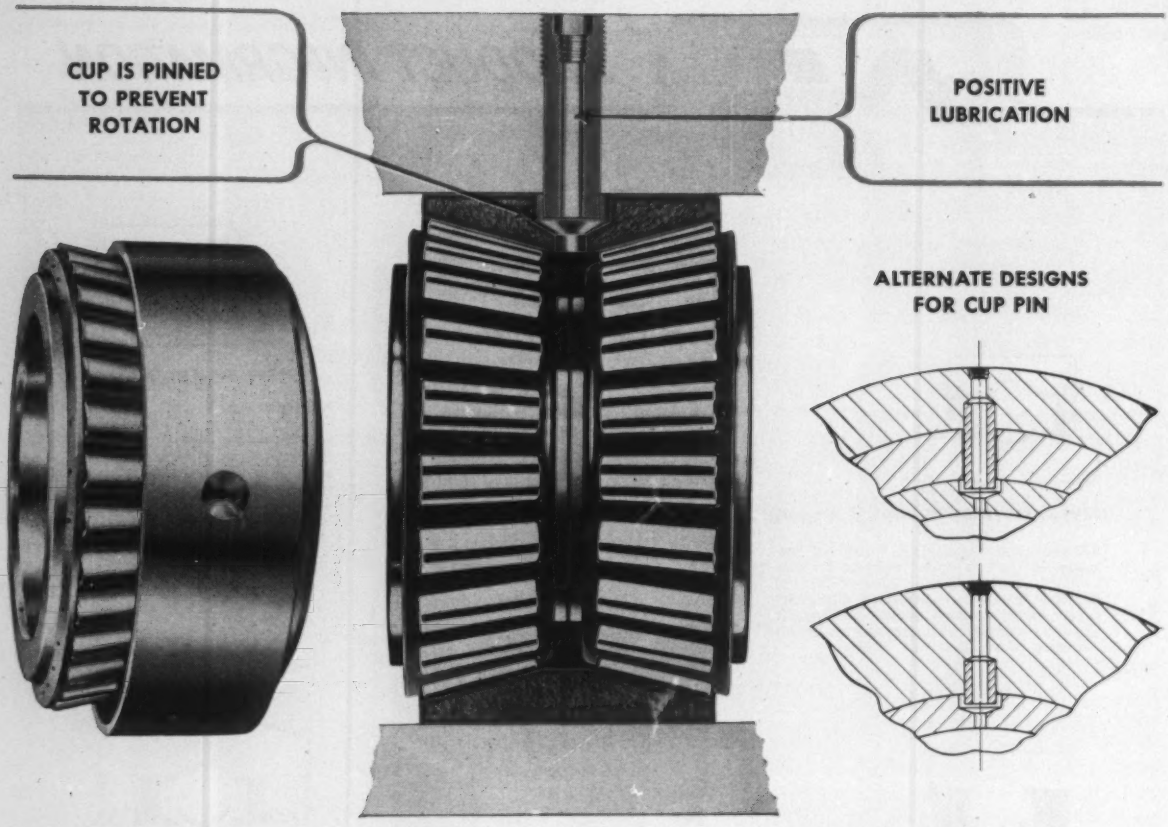
BALL BEARINGS
proved reliability you can build around



NOW! A double-row bearing for any floating position

REDUCES WEAR AND POUNDING
PROVIDES FOR POSITIVE LUBRICATION

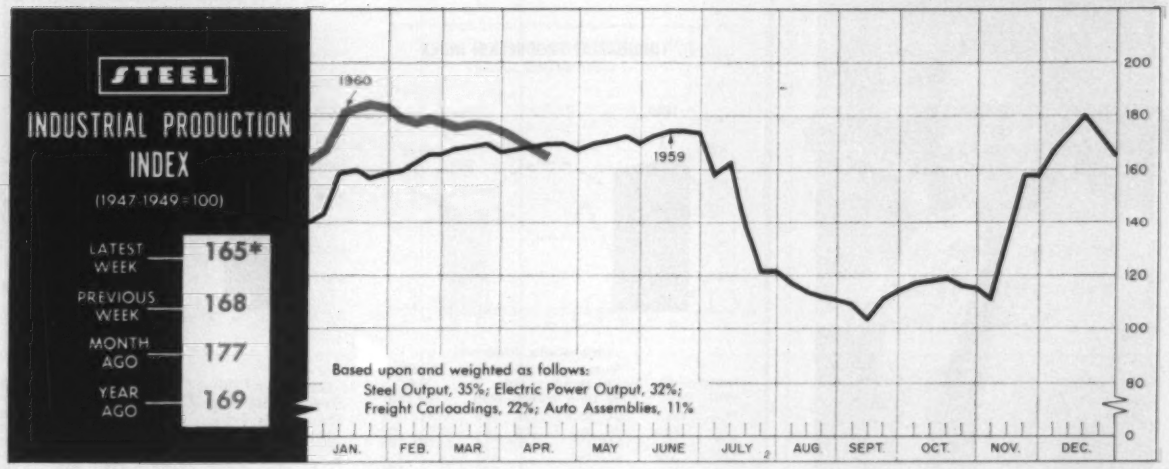
Now you can get a new Timken® bearing—first of its kind developed for floating bearing positions—that answers the problem of excessive wear from creeping and pounding in gear drives, spindles and many other applications. It's a pin-cup, double-row tapered roller bearing. Manufacturers can assemble and adjust gear drives, then merely set the pin. Result is a bearing that floats endwise but cannot turn in the housing. It greatly reduces wear, provides for continuous, positive lubrication. This new Timken bearing gives you all these advantages for those applications where there is an inherent tendency for the cup to creep or turn in the housing.
1) *Positive lubrication* because oil is fed continuously through the pin. 2) *Longer bearing life* because bearing creep is eliminated. Related parts are better protected, too.

This new pin-cup bearing results from Timken bearing research and development. Research to make machines perform better at lower cost. And the combined, new $2½ million engineering and research facilities of the Timken Company, unique in the industry, make progress like this possible. Make it yours when you use Timken bearings in the machines you build or buy. Another reason why "Timken" is your No. 1 bearing value. ***When you buy Timken® bearings you get...*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings



*Week ended Apr. 16.

Sales-Profit Outlook Good for 1960

IF THE FIRST QUARTER is any indication of things to come in metalworking, 1960 could be a record year for sales and profits. While the tally is far from complete, a sampling of early reports indicates that the initial three months may go down as a record for the period.

An analysis of the first 22 metalworking reports received last week shows: 1. Nineteen firms had greater sales compared with the corresponding 1959 quarter. 2. Fifteen had greater profits. 3. Of those with greater sales, three showed profit declines from the year-ago period. 4. Most of those who missed the 1959 profit level did so by a small margin. 5. The outlook for the rest of 1960 is favorable.

● **Record Is Possible**—Business sentiment and historical patterns both favor a continuation of high level profits for the rest of the year. STEEL's Panel of Economic Consultants predicted (in Apr. 4 issue, p. 91) that industrial production in the next three quarters will fluctuate only slightly around the high level of the first three months. For durable goods, they forecast a slight decline (about 1 per cent) in the last three months. Business activity in terms of gross national product is expected to expand each successive quarter to a new high of $515 billion (annual rate, seasonally adjusted) in the October-December period. Any significant decline in profits would be completely contrary to those expectations.

In the last nine years, the first quarter has been the peak for profits only two times. In two instances, the high was in the second quarter. In five of those years, the peak was reached in the final period. The outlook for 1960 is still good even if the zenith was reached in the first quarter. It would take at least one fairly bad quarter to erase the advantage built up so far. Keep in mind also that sales and profits during 1959's second half were depressed by the steel strike. It ap-

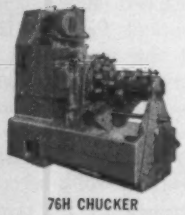
BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,305[1]	2,225	2,646
Electric Power Distributed (million kw-hr)	13,500[1]	13,494	12,609
Bituminous Coal Output (1000 tons)	8,315[1]	7,500	8,117
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,028	7,113
Construction Volume (*ENR*—millions)	$397 8	$356.2	$475.8
Auto, Truck Output, U. S., Canada (*Ward's*)	173,492[1]	171,080	172,715
TRADE			
Freight Carloadings (1000 Cars)	605[1]	598	634
Intercity Truck Tonnage (changes from year ago)	−0.5%	+0.8%	+20.8%
Business Failures (Dun & Bradstreet)	333	356	337
Currency in Circulation (millions)[3]	$31,827	$31,653	$31,365
Dept. Store Sales (changes from year ago)[3]	+18%	+22%	+18%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,071	$26,080	$24,321
Federal Gross Debt (billions)	$286.5	$286.7	$285.7
Bond Volume, NYSE (millions)	$21.0	$28.4	$32.3
Stocks Sales, NYSE (thousands of shares)	10,451	14,638	17,827
Loans and Investments (billions)[4]	$100.8	$101.0	$103.0
U. S. Govt. Obligations Held (billions)[4]	$24.4	$24.5	$33.0
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	230.7	230.8	220 5
All Commodities[7]	120.1	120.2	119.9
Commodities Other than Farm & Foods[7]	128.7	128.8	128.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

the special meaning of **BAIRD**

You own a machine tool that's 15 years old. You bought it new or, perhaps, used. You need spare parts. You go to the manufacturer and learn that while that same machine model is still being produced, there is no assurance that the parts you used will fit.



76H CHUCKER

This is one of the enigmas in the machine tool business today and the problem has its roots in quality control.

Here at Baird, unless there has been a complete model redesign, individual components on 1960 machines can be used on "sister" machines manufactured 25 and 30 years ago. Interchangeability is simply no problem.

NO. 1 BENCH POWER PRESS

There's another example of the special meaning of Baird to those of us charged with the responsibility of quality control. As manufacturers of high production equipment... Chuckers, Transfer Presses, Four-Slide equipment... Bench Presses and Vertical Continuous Lathes, our machines are never "finished" on the customer's floor. Before shipment, tooled machines are given good, solid production runs and parts are thoroughly checked to insure perfect operation and output. This is standard operating procedure, whether customer representatives visit us for a demonstration or not.

Do business with Baird . . . it pays.

Arthur DuBois

Arthur J. DuBois

BAIRD

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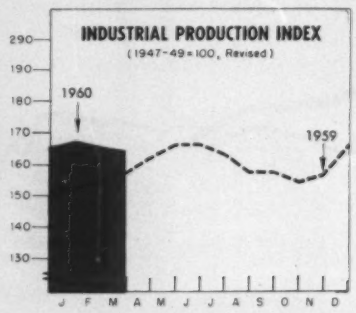
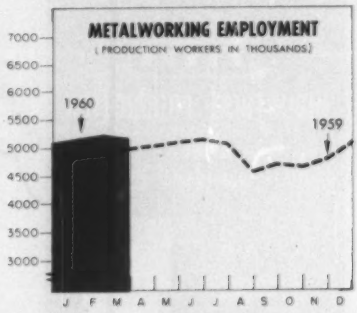
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production 1960	1959	Total Mfg. 1960	1959	Durables Mfg. 1960	1959
Jan.	168	152	168	150	181	156
Feb.	166	155	166	153	178	160
Mar.	165*	157	165*	156	176*	165
Apr.	...	162	...	161	...	170
May	...	166	...	165	...	177
June	...	166	...	166	...	178
July	...	163	...	163	...	171
Aug.	...	157	...	156	...	158
Sept.	...	157	...	156	...	157
Oct.	...	154	...	153	...	155
Nov.	...	155	...	154	...	155
Dec.	...	165	...	164	...	174
Avg	...	159	...	158	...	164

Federal Reserve Board. *Preliminary.
Charts copyright, 1960, STEEL.

1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	1,015	829	1,113	798	1,226
Apr.	1,037	840	1,126	803	1,229
May	1,051	853	1,153	814	1,233
June	1,067	866	1,167	833	1,224
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,039	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,054	864	1,190	892	1,247
Mar.*	1,053	858	1,188	880	1,223

U. S. Bureau of Labor Statistics.

pears that sales will top the record set last year while profits will rise above the record of 1956 (which was almost equaled in 1959).

• **Mildly Optimistic**—So far, most of the optimism for the rest of 1960 comes from makers of consumer durable goods and heavy equipment. Mark W. Cresap Jr., president of Westinghouse Electric Corp., reports: "New orders booked in the first quarter increased 20 per cent over the corresponding period a year ago, with each of the product groups registering gains . . . Billings of consumer products compared favorably with those a year ago despite adverse marketing conditions, and prospects for consumer products appear to be encouraging for the remainder of the year." In the first quarter, Westinghouse showed an increase of 35 per cent in after-tax earnings on a 4 per cent rise in billings.

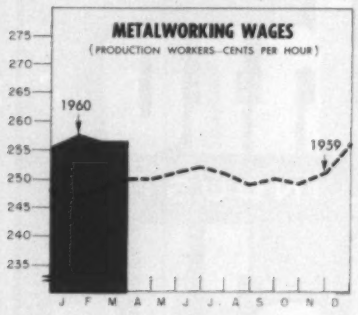
D. C. Minard, president of Trane Co., said that its shipments of air conditioning and heating equipment will reach $100 million for the first time this year. "Earnings will be proportionately higher," he added.

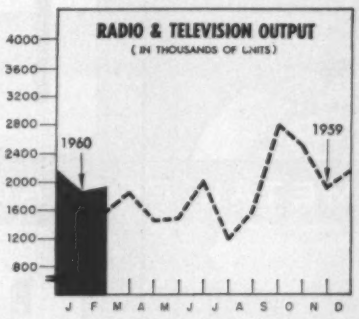
Don H. Gearheart, president of Hupp Corp., reported a 58 per cent gain in profits and a 24 per cent gain in sales in the first quarter over the corresponding 1959 period. And he stated that "the first quarter is not the peak sales season for any of Hupp's product lines . . . The second quarter will undoubtedly exceed the first quarter in all respects."

In reporting a gain of 9 per cent in orders for all products in the first quarter over the year-ago period, Ralph J. Cordiner, chairman at General Electric Co., said he regarded the outlook for the remainder of the year as "potentially favorable." While sales for GE were off the 1959 pace by 2 per cent in the first three months, net earnings were almost identical with those of 1959's corresponding period.

Profit Margins May Shrink

Even if sales and profits set records this year, profit margins are likely to be squeezed even harder than in the past. James M. Dawson, vice president and economist for the National City Bank of Cleveland, points out that in recent periods of stability, such as that predicted for the next year or two, increases in productivity have been





1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	282	235	248	221	263
Apr.	283	235	249	221	263
May	284	237	250	221	264
June	284	238	250	222	266
July	281	237	250	222	266
Aug.	264	238	250	222	269
Sept.	266	239	251	223	271
Oct.	265	236	252	224	270
Nov.	277	236	252	224	267
Dec.	285	241	254	227	273
1960					
Jan.	287	244	255	228	276
Feb.	286	243	255	228	275
Mar.*	285	242	256	229	274

*Preliminary.
U. S. Bureau of Labor Statistics.

	Radio		Television	
	1960	1959	1960	1959
Jan. ...	1,356	1,125	526	437
Feb. ...	1,442	1,125	503	460
Mar. ...	....	1,348	...	494
Apr. ...	....	1,040	...	389
May ...	....	1,040	...	432
June ...	....	1,430	...	571
July ...	....	829	...	350
Aug. ...	....	1,009	...	547
Sept. ...	....	1,981	...	808
Oct. ...	....	1,796	...	707
Nov. ...	....	1,346	...	561
Dec. ...	....	1,553	...	593
Totals ..	....	15,622	...	6,349

Electronic Industries Association.

small. In 1951-52 and again in 1956-57, output per manhour increased only 1¼ per cent a year. If the rate holds in 1960-61, and if hourly pay and fringes for labor move up 3½ per cent a year (following the steel industry pattern), "this would mean a 2½ per cent per year rise in unit costs. That in turn would spell either lower profit margins or higher prices, or both."

Consumer Still the Key

John W. Harriman, economist for Tri-Continental Corp. and the Broad Street Group of Mutual Funds, New York, declares that "no recession is imminent in 1960. Instead, business will hold at a satisfactory level, possibly somewhat below that of the first quarter, during the next two quarters and perhaps equal or even slightly higher during the final quarter.

"Spending by consumers represents the most important single factor in the economy both historically and at the present time," he states. "The magnitude of consumer spending will determine the course of business for the balance of 1960." While admitting that negative forces are at work in the economy, he says that "they are not sufficient to reverse the cyclical direction of the economy. Positive factors are also at work, the most powerful of which are higher business investment in plant and equipment, increased state and local government purchases, and consumer spending."

Trends Fore and Aft

- Auto registrations, including both domestic and foreign cars, totaled 494,178 in February, reports R. L. Polk & Co. That's a seasonally adjusted annual rate of slightly over 7 million units.

- STEEL's industrial production index dipped another 3 points to a preliminary 165 (1947-49 = 100) in the week ended Apr. 16. The entire decline was caused by a further cutback in steel production.

- Department store sales in the week ended Apr. 9 rose to the highest point of the year and a record for any Easter season week, reports the Federal Reserve Board.

- Ross D. Siragusa, president of Admiral Corp., Chicago, says the pick-up in appliance sales noted at the beginning of the second quarter should continue during the rest of the year.

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is the originator and developer of the revolutionary new L-100-M
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double carbide Band Saws
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Ohio Iron and Steel Rolls

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- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
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THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

STANLEY E. WOLKENHEIM
Fairbanks, Morse marketing

H. R. EDELMAN III
Heyl & Patterson exec. v. p.

WILLIAM D. CAMERON
Cleveland Graphite Bronze post

ARTHUR CARLSON
Finkl & Sons v. p.

Stanley E. Wolkenheim was appointed vice president-marketing, **Fairbanks, Morse & Co.**, Chicago. He was vice president-director of marketing at A. O. Smith Corp. He assumes his new post May 1.

Heyl & Patterson Inc. named **H. R. Edelman III** executive vice president. He was vice president-production. **J. F. Page** was elected vice president-assistant to the president and treasurer. **Charles F. McKenna** was elected secretary.

Harold R. Beachler, works manager of the Etna, Pa., plant of **National Supply Co.**, fills a new post of manager of tubular production. He is responsible for manufacturing, engineering, research, and product development at the Ambridge, Pa., and Etna tubular mills, and at the underfloor duct plant in Melrose Park, Ill. He has headquarters in Pittsburgh general offices. **M. J. Demeter** succeeds Mr. Beachler as works manager at Etna.

Clifford A. Mesler was made sales manager, **Bayonne Bolt & Nut Corp.**, Bayonne, N. J. He succeeds **Louis T. Rampolla**, retired. Mr. Mesler was Western sales manager for Buffalo Bolt Corp.

Paul S. Gruber was named manager and chief engineer, Furnace Engineering Div., **Ferro Corp.**, Cleveland. **John A. Dvorak** was made assistant chief engineer to succeed Mr. Gruber.

William W. Lovette was made sales manager, **Metals Sales Inc.**, Los Angeles.

William D. Cameron was appointed general manager, **Cleveland Graphite Bronze Div.**, Cleveland, Clevite Corp. He was manager of production engineering for Lincoln-Mercury Div., Ford Motor Co. He succeeds **Willard W. Brown**, recently elected vice president-Bearing Group of Clevite.

A. O. Smith Corp., Milwaukee, named **Thomas H. Creden** general manager, Tubular Div.; **Warren Hendricksen**, general manager, Atomic & Process Equipment Div., both newly created posts. In addition to sales, they are in charge of engineering, manufacturing, and all activities of their respective divisions. A similar post with the new Space-Ordnance Div. was assigned to **H. D. Barnes**, former director of defense products and atomic energy equipment.

Walter J. Blair was made manager, vertical pump product sales, **Peerless Pump**, Hydrodynamics Div., Food Machinery & Chemical Corp., Los Angeles. He was product sales manager of the process line of pumps produced by Peerless.

William C. Diman was made manager, Furnace Div., **C. I. Hayes Inc.**, Cranston, R. I.

Ralph E. Parnaby was made general manager of **B-Z Machine Div.**, R. D. Fageol Co., Kent, Ohio.

Harold B. Berman was placed in charge of technical sales and development of platinized titanium electrodes produced by **Engelhard Industries Inc.**, Newark, N. J.

Arthur Carlson was elected vice president-production for **A. Finkl & Sons Co.**, Chicago. Associated with the company 25 years, he had been serving as assistant production manager under **Aubrey Lane**, now retired.

Rudolf H. Hertzog was named chief product engineer for wire and cold rolled steel products of **John A. Roebling's Sons Div.**, Trenton, N. J., Colorado Fuel & Iron Corp. He formerly served as metallurgical engineer in the Roebling wire mills.

Richard H. Ewert was elected vice president-treasurer of the newly organized **Sewall Gear Mfg. Co.**, St. Paul. He has been with the gear industry in Chicago for the last 20 years, most recently with Foote Bros. Gear & Machine Corp.

Edward S. Northup fills the new post of assistant to the president of **Dura Corp.**, Oak Park, Mich. He was product manager, Electric Housewares & Bed Covering Dept., Westinghouse Electric Corp., at Mansfield, Ohio.

Robert W. Hanlon was named general superintendent, Coke & Iron Div., **Pittsburgh Coke & Chemical Co.**, Pittsburgh. He was superintendent of the coke plant at Neville Island.

William J. Mericka was elected chairman of **Van Norman Industries Inc.**, New Bedford, Mass. He succeeds **Donald P. Hess**, retired.

Robert B. MacKenzie was made director of marketing, **Sierra-Schroe-**

EDGAR V. RANKIN

WILLIAM R. KUNKEL

Boston Gear Works promotions

J. ROBERT FERGUSON JR.

SAMUEL NAISMITH

U. S. Steel posts, Engineering Dept.

der Controls Div., Los Angeles, Idaho Maryland Mines Corp.

Boston Gear Works Div., Quincy, Mass., Murray Co. of Texas Inc., named **Edgar V. Rankin** vice president; **William R. Kunkel** general manager; **Robert G. Emerson Jr.** assistant general manager.

George W. Fenimore was made general manager of **Thompson Ramo Wooldridge Inc.'s** new International Div., at West Coast headquarters of TRW in Canoga Park, Calif.

Blake Ward was appointed St. Louis Div. manager for **A. M. Byers Co.** to succeed **W. B. Simpson**, retired.

H. N. Cottingham was elected president and general manager, **Diamond Chain Co. Inc.**, Indianapolis, succeeding **G. E. Schloot**, retired. Mr. Cottingham was vice president and assistant general manager. **B. K. Sollars**, vice president and factory manager, succeeds Mr. Cottingham as assistant general manager. **F. R. Gray** was made factory manager.

J. Robert Ferguson Jr. was made assistant vice president-design and construction, Engineering Dept., **United States Steel Corp.**, Pittsburgh. Former assistant vice president-appropriations, he is succeeded by **P. S. Weaver**, former chief engineer-project development. **Samuel Naismith** was made assistant vice president-facility planning for the department.

Donald Armstrong was made assistant sales manager-field, **Van Keuren Co.**, Watertown, Mass.

John P. Henson was made sales manager, Universal Joint Div., **Dana Corp.**, Toledo, Ohio.

Sheldon K. Towson Jr., vice president, **Elwell-Parker Electric Co.**, Cleveland, has also been elected general manager.

George Cameron joined **Acar Machine & Tool Co. Inc.**, Roseville, Mich., as vice president-general manager, affiliate of Acar Broach Co. He was director of engineering at Colonial Broach & Machine Co., Detroit.

At the Danville Div., Danville, Ill., **Bohn Aluminum & Brass Corp.**, **P. G. Kayser** was named manager, Heating & Cooling Coil Dept.; **B. W. Reid** sales manager, and **Frank Oreskovich** senior application engineer. **W. F. Foster** joined the Danville Div. as chief product engineer of air conditioning products to succeed Mr. Kayser.

Claud S. Gordon Co., Chicago, appointed **E. G. Weissenberger** product manager of a new division to produce precision metal sheathed, ceramic insulated thermocouples, and a line of fittings and accessories. He was with Pyro Electric Co.

Edward W. Haskell was appointed sales manager of **Truck-Man Lift Trucks**, Jackson, Mich., division of Knickerbocker Co.

R. L. Allshouse was made assistant sales manager, **Wean Engineering Co. Inc.**, Warren, Ohio. He con-

H. N. COTTINGHAM

Diamond Chain president

SHELDON K. TOWSON JR.

Elwell-Parker v. p.-gen. mgr.

GEORGE CAMERON

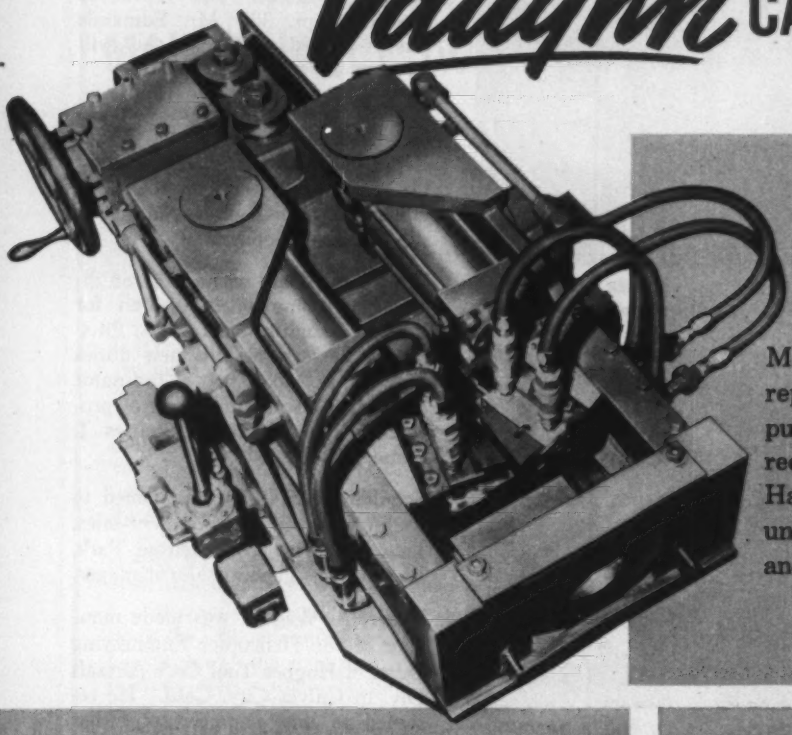
joins Acar Machine & Tool

EDWARD W. HASKELL

Truck-Man Lift Trucks sales

Name your **pointing** and **straightening** needs...

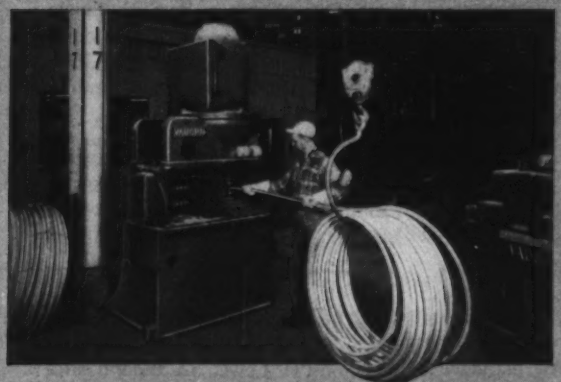
Vaughn® CAN MEET THEM!



New VAUGHN HYDRAULIC PUSH POINTER

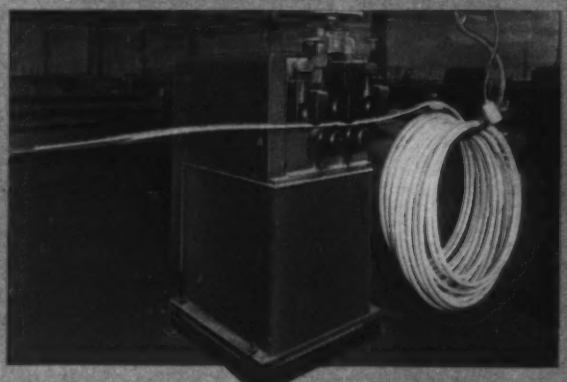
Mounted on the heavy duty Motobloc, replacing the die block, this compact push-type pointer eliminates floor space required for a separate 4-roll machine. Handling rod sizes from ½" to 1¼", the unit is hydraulically operated, and points and pushes rod through die into Motobloc.®

VAUGHN EXTRA HEAVY 4-ROLL CONTINUOUS POINTER



A specialized unit for heavy service, ruggedly constructed for long useful life. Accommodating rod from ½" to 1¼", this pointer has two vertical and two horizontal rolls—points rod easily without twist.

VAUGHN ROLL STRAIGHTENER



Mechanically straightening the end of the coil in preparation for moving to pointer and die box, the 3-roll straightener saves time, manpower and money while boosting production. Unit with over-riding clutches is available for use with continuous processing lines.

"Quick on the Draw!"®

The VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

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A COMPLETE LINE OF POINTING MACHINES FOR ALL ROD AND WIRE SIZES

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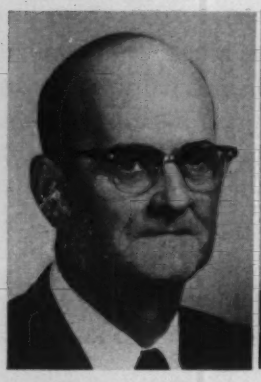
E. RUSSELL CROSS
Tubular Rivet president

PAUL P. RADECKY
Hickok mfg. Supt.

WALTER L. MOORE
J&L dir.-commercial research



LEWIS J. TRAUTHWEIN
Armco Steel dept. supt.

JOHN E. WILSON
Marchant mfg.-mgr.

EUGENE A. NICOL
Maytag Plant 2 production

tinues as European sales representative.

Lewis J. Trauthwein was appointed superintendent of the Blast Furnace Dept. of the Hamilton, Ohio, plant of **Armco Steel Corp.** He succeeds the late **E. A. Kercamar.**

John E. Wilson was made manager of manufacturing, Marchant Div., **Smith-Corona Marchant Inc.**, Oakland, Calif. He was plant manager.

S. L. Jackson was made sales manager, Eastern region, **Union Carbide Metals Co.**, division of Union Carbide Corp. He is in Phillipsburg, N. J.

Stephen M. Reynolds was appointed director of industrial relations at **Minneapolis-Moline Co.**, Hopkins, Minn.

Ceco Steel Products Corp., Chicago, elected **Ned A. Ochiltree** chairman and chief executive officer, and **C. Foster Brown Jr.** president to succeed Mr. Ochiltree.

Eugene A. Nicol was promoted to general superintendent of production at **Maytag Co.**'s Plant 2 in Newton, Iowa. He succeeds **George L. Alward,** who resigned to accept a position with Brunswick-Balke-Collender Co.

A. L. Caney was made manager of consumer products - sales, **Parish Pressed Steel Div.**, Reading, Pa., Dana Corp. He was a regional sales manager for Mobile Products Div., Sperry Rand Corp.

John A. Farris was named manager of engineering liaison by **Aircraft Porous Media Inc.**, Glen Cove, N. Y., subsidiary of Pall Corp.

Richard F. Horak was appointed sales office manager at Denver for **Pacific Scientific Co.**

William P. Leonrer was made district sales manager, Chicago plant, **Joseph T. Ryerson & Son Inc.** He is succeeded as manager of alloy and stainless steel sales, Chicago plant, by **G. Phillip Later.**

E. Russell Cross was elected president, **Tubular Rivet & Stud Co.**, Quincy, Mass. He succeeds **Bradford C. Edmands,** who retires as president Apr. 30. Mr. Edmands was re-elected chairman and will serve in an advisory capacity.

Paul P. Radecky was named manufacturing superintendent, Meter Dept., **Hickok Electrical Instrument Co.**, Cleveland. He was project engineer for special aircraft and missile meter development.

Walter L. Moore was appointed director of commercial research for **Jones & Laughlin Steel Corp.**, Pittsburgh. He assumes his new duties May 1. Mr. Moore was co-ordinator of production planning control procedures. He succeeds **Charles J. Lause Jr.**, resigned.

Spaulding A. Norris was named to the new post of vice president-sales, **Yeomans Bros. Co.**, Melrose Park, Ill. He was general sales manager.

Robert A. Wagner was made manager of the Helicopter Engineering Dept. of **Hughes Tool Co.'s** Aircraft Div. in Culver City, Calif. He resigned as chief engineer for Hiller Aircraft Corp.

In the Engineering Dept. of **Jones & Laughlin Steel Corp.'s** Stainless & Strip Div., Detroit, **Roy T. Lewis** was made division assistant chief engineer. **Ernest Sevenich** and **Emory C. Walton** were made project engineers.

Arthur O. Grumney was made assistant sales manager, **Dekoron Products Div.**, Samuel Moore & Co., Mantua, Ohio.

OBITUARIES...

Raymond H. Lewis, 52, general sales manager, **Buflovak Equipment Div.**, Buffalo, Blaw-Knox Co., died Apr. 12.

Carl Meyers, 68, vice chairman, **Colorado Fuel & Iron Corp.**, died Apr. 10 in Painesville, Ohio.

Percy H. Batten, 83, founder and chairman, **Twin Disc Clutch Co.**, Racine, Ill., died Apr. 8.

R. E. Brooks, 77, co-founder of **Cleaver - Brooks Co.**, Milwaukee, died Apr. 4.

WANT TO TURN MAINTENANCE DOLLARS INTO PROFIT DOLLARS?

Tom Robertshaw can show you how. Tom's a paint expert—one of a growing force of specialists that constitutes Du Pont's Technical Service Group. His mission: to help you pare down the high cost of maintenance painting. As he sees it:

"Every maintenance dollar you save is a profit dollar. Of course, to insure maximum return on your investment, you've got to begin with quality paint. Too many maintenance men have learned the costly lesson that price-per-gallon as a measure of economy can be mighty misleading. When you specify Du Pont, you're getting the best paint available, backed up by proven performance in the field.

"However, that's only half the story. To bring down the cost of protecting your equipment—and keep it down—the right paint *system* is vitally important. Here's where Du Pont technical competence really pays off. We see to it that the system you employ is specifically suited to your needs. Our recommendations, based on a thorough study of your particular problem, cover everything from surface preparation and paint selection to the most efficient methods of application. We'll show you, too, how to use color effectively to improve plant appearance and promote safety. It adds up to this: lasting protection and longer service life *at lowest cost per square foot per year.*"

There are men like Tom Robertshaw working out of Du Pont district sales offices from coast to coast. Why not let one of them put his training and experience to work for *you?* Call the office nearest you, or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. S-64, Wilmington 98, Delaware.

* * *

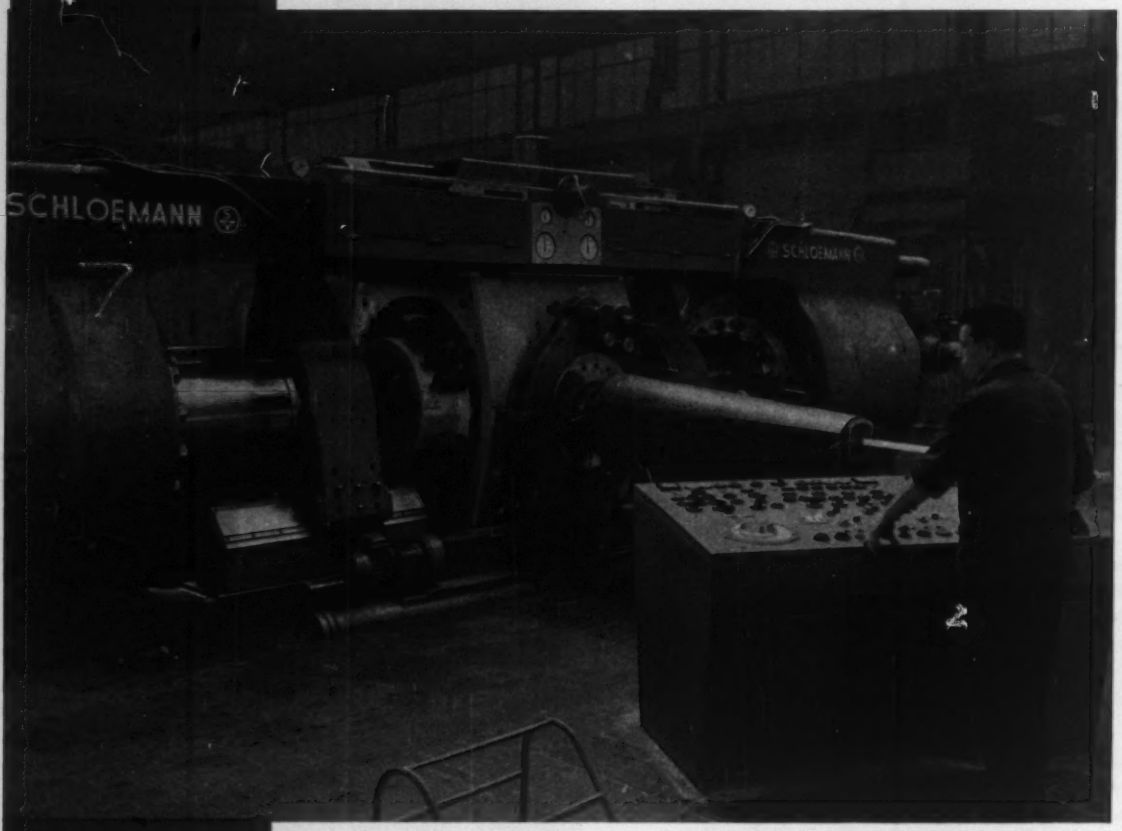
Thomas J. Robertshaw began his career with Du Pont in 1938. Following wartime Navy service as an Aircraft Finishes Specialist, he returned as Assistant to the Sales Technical Advisor in Philadelphia. In 1952 he was made responsible for Maintenance Sales in New England and upstate New York. Since 1957, he has been Central District Manager, Industrial Maintenance Sales. Among the industries for which he has solved maintenance painting problems: marine, automotive, chemical, steel, petroleum and food.

DU PONT PAINTS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

SCHLOEMANN

18 Aluminum Cable Sheathing Presses in two Years



Operational sequence of the SCHLOEMANN aluminum cable sheathing press is now fully automatic, in continuous cycles. Sheathing thickness is held to specification even though extrusion may be interrupted. This press is an outstanding example of many successful innovations accomplished by SCHLOEMANN in connection with the plastic deformation of steel and non-ferrous metals. *Write today for descriptive literature.*

FELLER ENGINEERING COMPANY 1191 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

Inco Begins Operation Of $12 Million Ore Mill

INTERNATIONAL Nickel Co. of Canada Ltd., Copper Cliff, Ont., has opened a new $12 million ore milling plant at its Levack Mine in Ontario's Sudbury area. It's part of a capital improvement program to raise the company's nickel production capacity to 385 million lb per year by 1961.

The mill (capacity: 6000 tons of ore per day) is highly automated. Extensive use of instrumentation permits centralized control of crushing, grinding, flotation, and a dewatering process in producing nickel and copper concentrates from ore. Recently developed techniques, such as the use of radioactive isotopes for making density measurements, have been incorporated into the new plant.

Crushing facilities consist of concrete silo-type bins, conveyors, and two 7 ft cone crushers which reduce the ore to less than ¾ in. in size. The grinding units consist of a 15 ft rod mill, a 14 ft ball mill, and two cone classifiers.

More than 30 cars of nickel and copper concentrates are shipped each day to the Inco smelters at Copper Cliff and at nearby Conniston. The Levack installation brings to three the number of ore milling plants operated by Inco at its nickel mines in the Sudbury area.

Tool Firm Sells Plant

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., is selling its Cincinnati plant to Cincinnati Milling Machine Co., Cincinnati. The transaction involves real estate only. Giddings will move the manufacture of its drilling machines to Wisconsin.

Mallory Centralizes

P. R. Mallory & Co. Inc., Indianapolis, has combined two of its manufacturing divisions and three subsidiaries in a metallurgical and mechanical group. Involved: Mallory Metallurgical Co., Indianapolis; Electronic Timers Co., Warsaw, N. Y., and Pana, Ill.; Philadelphia Bronze & Brass Corp., Philadelphia; S-M-S Corp., Detroit; Indar Corp., Indianapolis. Chief products of the group are electrical contacts, high density metals, resistance welding materials, sequence time switches, nonferrous forgings and castings, and all types of powder metallurgical products.

Pangborn Goes Airborne

Pangborn Corp., Hagerstown, Md., has acquired a fleet of three planes to implement its customer service and to bring prospects to Hagerstown for conferences and equipment demonstrations. First mission: Take visitors at the foundry show to the plant for inspection trips.

U.S., Foreign Firms Join

Clark Equipment International C.A., a subsidiary of Clark Equipment Co., Buchanan, Mich., has acquired a 50 per cent interest in Eximia S.A., Buenos Aires, Argentina. Eximia will make and sell Clark's line of material handling and construction equipment under license. The Argentine firm manufactures its own line of cranes and hoists. Clark will assist in expanding plant facilities from 40,000 to 60,000 sq ft. Production will begin immediately on Clark towing tractors and fork trucks in capacities of 2000 to 4000 lb.

India Orders Locomotives

General Electric's Locomotive & Car Equipment Dept., Erie, Pa., will build ten diesel electric industrial locomotives for the Indian Iron & Steel Co., Burnpur, India. Estimated cost: About $750,000.

Brush Plans Expansion

Brush Beryllium Co., Cleveland, plans a substantial expansion of its beryllium metal facilities. Capacity of its Elmore, Ohio, plant for vacuum cast beryllium billets will be increased from 12,500 lb per month to 24,000 lb; beryllium hydroxide capacity will be boosted from 35,000 lb of beryllium content per month to 60,000 lb. Two plants are being constructed, one at Shoemakersville, Pa., the other at Hayward, Calif.

Contact Office Opened

Companhia Siderurgica Paulista, Sao Paulo, Brazil, has established offices at 217 Madison Ave., New York. They will serve as a contact point with U. S. manufacturers supplying machinery and equipment for a steel mill under construction at Piacaguera, state of Sao Paulo. Silvino da Silva heads the office. Design and construction supervision of the steel mill is under the direction of Kaiser Engineers International.

Expands Strip Facilities

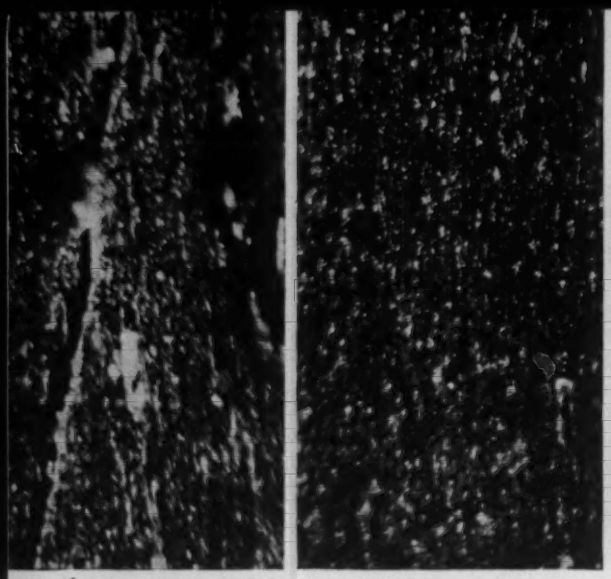
Fairmont Aluminum Co., Fairmont, W. Va., a subsidiary of Cerro de Pasco Corp., is planning to expand its strip mill facilities. The project was awarded to Loewy-Hydropress Div. of Baldwin-Lima-Hamilton Corp., New York. The program includes a two stand tandem mill for hot and cold rolling, a single stand cold mill, auxiliary equipment, and coil handling equipment.

NEW PLANTS

Acoustica Associates Inc., Mineola, N. Y., has expanded its plant space in Garfield, N. J., and Los Angeles from 35,000 to 65,000 sq ft. The company designs and manufactures ultrasonic cleaning systems, liquid gage and missile propellent control systems. In Garfield, Acoustica has opened new facilities for electronic production and systems work.

E. F. Houghton & Co., Philadelphia, opened a new plant at 54 Tanforan Ave., San Francisco. The 30,000 sq ft plant includes manufacturing space, a new office building, and control laboratory. Equipment installed includes provision for

(*Please turn to Page* 96)



Above you see magnified sections of ordinary cable insulation (left) and Anaconda Butyl (AB) Cable insulation (right).

These screens, used in the extrusion head to entrap possible contaminants, are so fine they actually hold water.

TWO BIG REASONS WHY ANACONDA BUTYL (AB)

1. SPECIALIZED DEVELOPMENT

Because Anaconda was the first to develop butyl-insulated cable—and because butyl handles differently from other rubbers—many problems came up during development. Here are some examples—and how Anaconda engineers solved them.

A mixing problem: Like all raw rubbers, butyl in its raw state is a practically useless material. So it's mixed with specially selected additives and ingredients. Because it is very difficult to disperse these ingredients in butyl, Anaconda had to develop an entirely new mixing process and separate facilities to avoid contamination. Look at the comparison photos and see how successful it is.

A shielding problem: To eliminate laborious and time-consuming cleaning of insulation surfaces, Anaconda developed a semiconducting tape* which firmly adheres to the insulation—and yet is easy to remove during splicing and terminating.

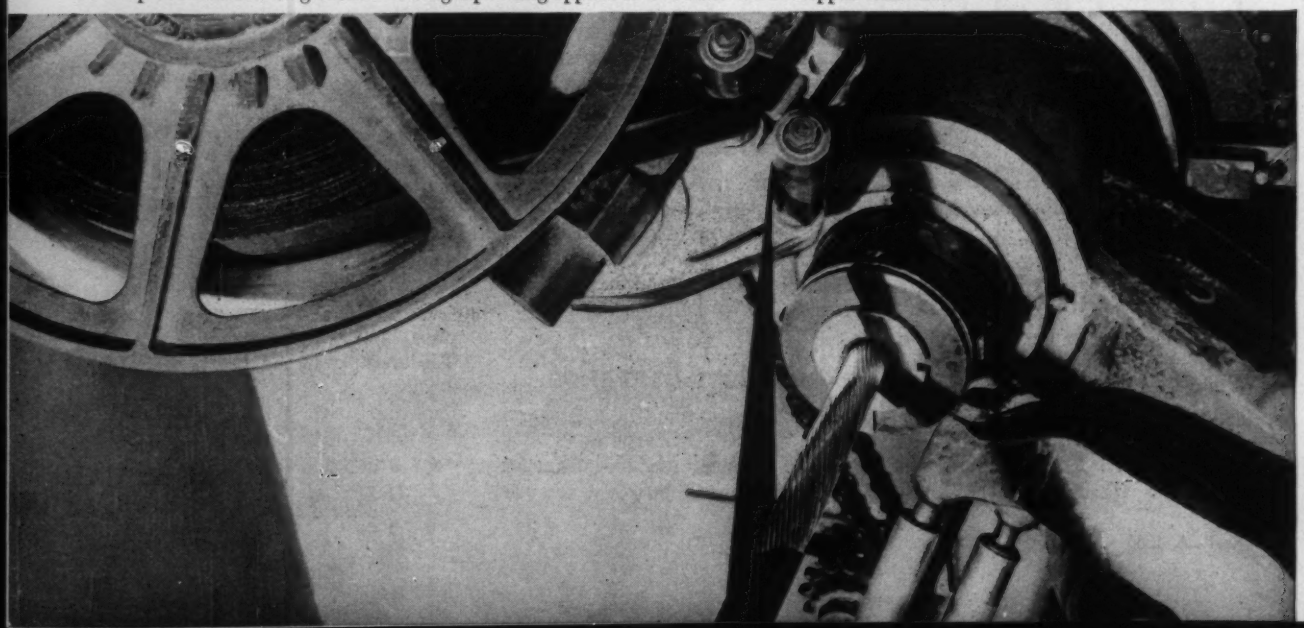
Even a vulcanizing problem: Ordinary vulcanizing equipment might have a tendency to deform butyl insulation. So Anaconda developed huge vulcanizing tanks which admit steam faster, vulcanize quicker and eliminate distortion.

These few examples show you the types of problems Anaconda engineers were up against. Their solutions help show you why you can be sure Anaconda Butyl (AB) Cable is the finest cable you can buy.

2. SPECIALIZED MANUFACTURE

Anaconda's new Marion Mill was designed to handle only one product—Anaconda Butyl (AB) Cable.

Close-up of semiconducting strand-shielding tape being applied to 500-Mcm tinned copper conductor.



An Anaconda development—semiconducting tape—adheres firmly to insulation, yet removes easily, facilitating splicing and terminating.

MEANS RELIABLE HIGH-VOLTAGE CABLE

The men behind this highly specialized equipment have but one job . . . to study and improve the design and manufacture of rubber-insulated high-voltage cable. Here are a few of the many places where they built precision right into the production line.

Insulation purity: For extra protection against contamination, the unvulcanized Anaconda Butyl is passed through a series of screens, one of which is so fine it will hold water.

Strand-shield taping: For better equalization of internal electrical stress, Anaconda applies a special fine-mesh semiconducting tape under the insulation of all stranded high-voltage cables.

Vulcanizing in lead: Conventional lead presses must stop periodically for refilling—severely heating up and often damaging the cable section in the die block, so Anaconda extrudes lead continuously. In the next step, exceptionally large drums are used for vulcanizing in lead to eliminate distortion of jackets and insulation.

These few examples help show you that the manufacture of Anaconda Butyl (AB) is highly specialized, highly precise—and why Anaconda offers you the big advantage of consistent high quality.

*Pat. applied for

ASK THE MAN FROM

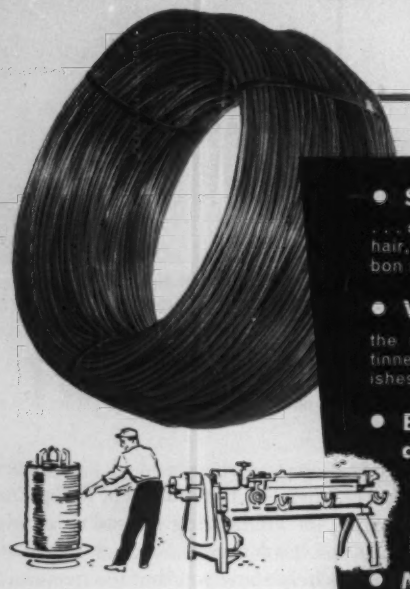
ANACONDA®

ABOUT BUTYL (AB) HIGH-VOLTAGE CABLE

Huge reel entering large vulcanizing tank which vulcanizes cable quicker than conventional methods, eliminating distortion of insulation.

WIRE

BACKED BY A HALF CENTURY OF EXPERIENCE



- **Sizes up to 9/16"...**
  ... down to almost the size of a human hair, in low carbon and medium low carbon steels.
- **Wire of many finishes**
  the right wire for the job—coppered, tinned, bright, galvanized and other finishes to fit your production needs.
- **Better forming and workability**
  Continental Wire is available in almost any temper and analysis in low and medium low carbon steels for your particular forming jobs.
- **Metallurgical service**
  Thousands of case histories provide unsurpassed resources for developing a practical solution to your wire problems.

ECONO-COIL—Reduces scrap loss up to 90 percent. Saves material handling time. The Econo-Coil gives you continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gage through ½" diameter. Shipped on returnable Econo-Coil reels.

LEVERPAK—Mechanizes your wire handling, protects wire against moisture, dirt and handling damage. LEVERPAK permits long uninterrupted runs of 500# to 650#, depending on wire sizes. Saves scrap, downtime, stores easily.

SPECIAL SHAPES—D-shaped, V-shaped, oval, half-oval, half-round, square, rectangular, triangular, keystone-shaped and others. Saves fabricating and machining costs.

Chances are you have a problem right now that we can help you solve—with Wire. Call us.

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

Wire Specialists for over Half a Century

PRODUCERS OF Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

(*Concluded from Page* 93)

sulfonation, saponification, compounding, esterification, and condensation reactions.

Dracco Div. of Fuller Co., Cleveland, is building an 18,000 sq ft addition to its present facilities. The company produces dust collection and pneumatic conveying equipment.

Tube-Kote Inc., Houston, will build a $300,000 plant in Edmonton, Alta. The company produces baked on plastic coatings for oil field tubular equipment.

Newman Steel Warehouse Ltd., St. Catherines, Ont., will build a $500,000 warehouse in Saltfleet Township. The building will provide 50,000 sq ft of space.

American Can Co., New York, plans to expand its research center in Barrington, Ill. Ten thousand sq ft will be added to the existing 100,000 sq ft. The addition will accommodate prototype and experimental equipment.

Electro-Nuclear Metals, Roseville, Calif., plans to build a $2 million plant near Caliente, Nev. The plant will process zirconium and hafnium ore mines at Escalante, Utah.

Westinghouse Electric Corp., Pittsburgh, is opening a 700,000 sq ft supply depot at Columbus, Ohio, as part of its program to streamline distribution of consumer products.

Food Machinery & Chemical Corp., San Jose, Calif., will construct the first phase of a new research and engineering center in Santa Clara, Calif. The 40,000 sq ft building will house mechanical, electronic, physics, and material processing laboratories, as well as engineering and administrative offices.

Great Eastern Wire Corp., Elizabeth, N. J., opened a 20,000 sq ft wire drawing mill. The plant has complete facilities for processing wire from rod cleaning to wire drawing.

Liberty Tool & Die Corp., Rochester, N. Y., will build a $300,000

(*Please turn to Page* 100)

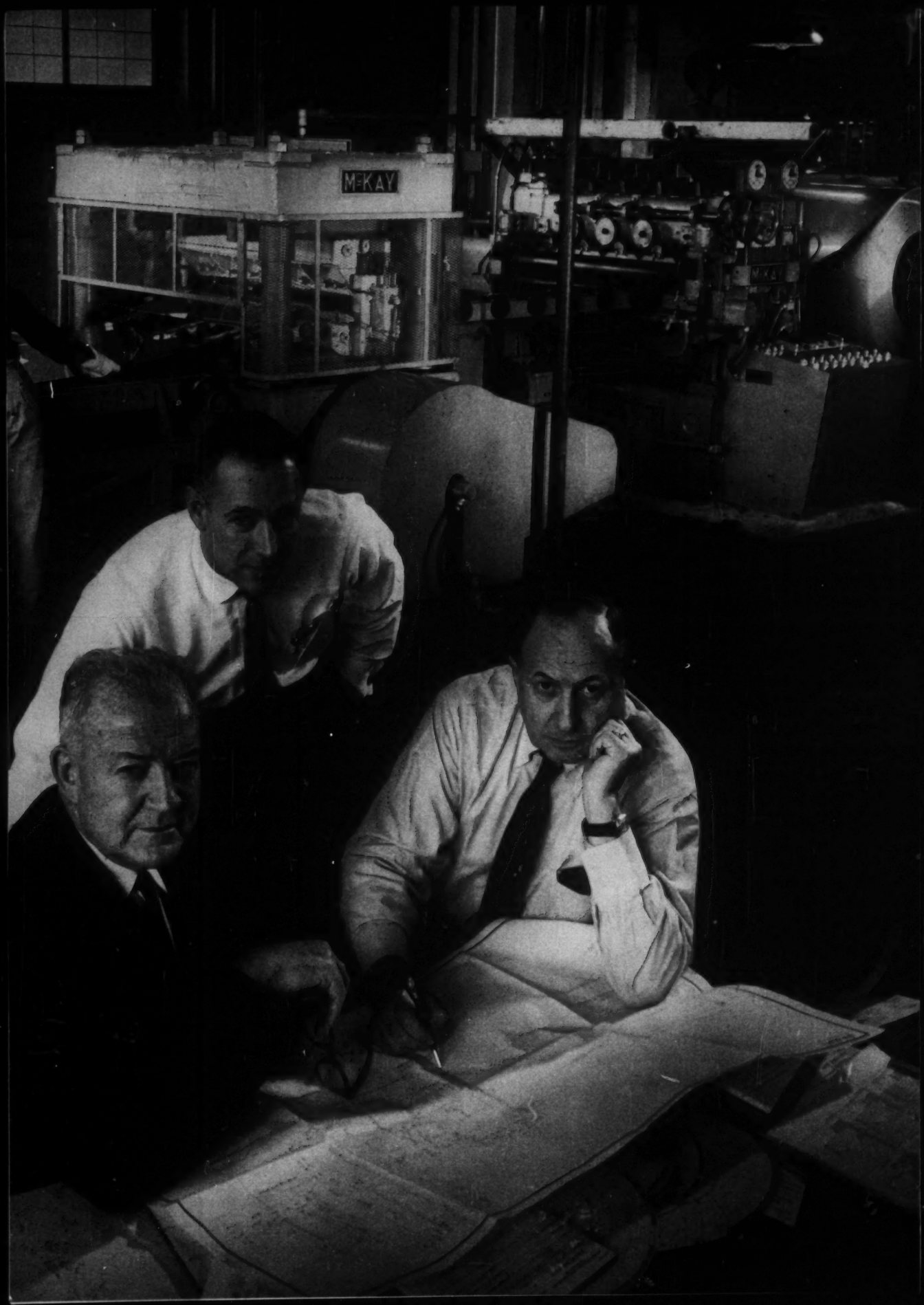
in 1960...

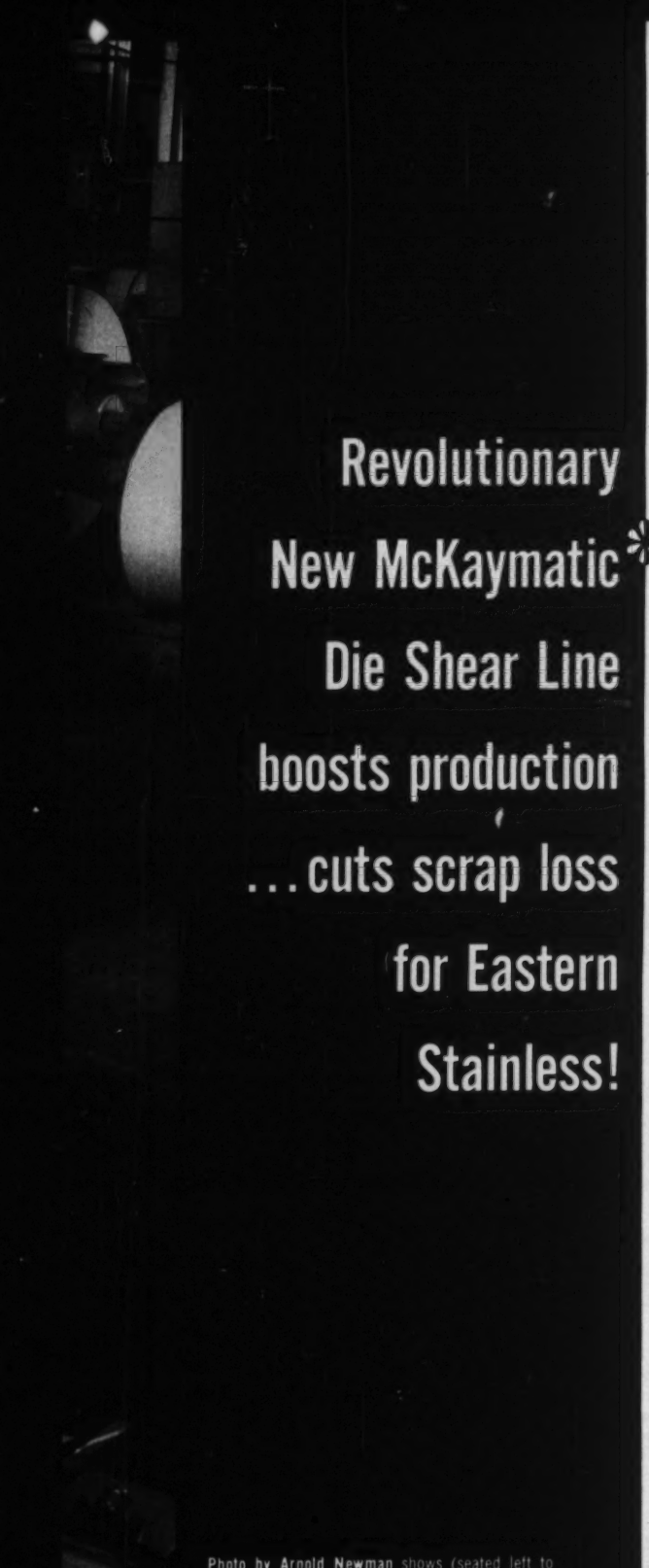
LOOK TO

McKAY MACHINE

FOR PROGRESS IN METAL PROCESSING

FOR EXAMPLE, the revolutionary new McKaymatic* Die Shear Line that has reduced costs and cut scrap losses for many steel makers, warehousers, and fabricators. For the complete story on one of these — Eastern Stainless Steel Corporation—please turn the page.


McKAY



Revolutionary New McKaymatic* Die Shear Line boosts production ...cuts scrap loss for Eastern Stainless!

Photo by Arnold Newman shows (seated left to right) W. F. Schneid, vice president—general manager, and H. J. Verner, chief engineer of Eastern Stainless Steel Corp., discussing cost reductions in stainless steel processing with (standing) McKay Machine sales engineer, Robert D. Lynn, in front of a McKaymatic* Die Shear Line recently installed in Eastern Stainless' cold strip department

"We consider the McKaymatic* the finest advancement in shearing to come along in a great many years," says W.F. Schneid, vice president-general manager, of Eastern Stainless Steel Corporation, Baltimore, Md. "We have reduced production time, cut our scrap loss, and have recorded an overall increase in department efficiency as a direct result of this new McKay die shear line," Mr. Schneid continues.

Eastern Stainless is a prime supplier of stainless steel sheets, strip and plates, for aircraft and missile parts, for food, chemical, paper and textile machinery and for architectural uses. It produces 25 grades of stainless steel in its own modern electric furnace facilities, and ships about sixty-six percent of it in sheet form.

Programs many grades instantly—Through improved roller leveler techniques, Eastern Stainless found it was able to instantly program many grades of sheet through its new McKaymatic* Die Shear Line. The line decoils, levels in a 17-roll McKay Roller Leveler, measures by electronics and cuts to length—replacing a cut-up, re-level, and re-square operation prior to boxing. Production of cut lengths has been substantially increased.

The result, they report, is cost savings. Says Mr Schneid: "As a result of our efforts to improve customer service, we installed this line to speed up production of these cut lengths. It has enabled us to break a production bottleneck for which there seemed to be no solution."

Line eliminates stretcher leveling—Mr. Schneid continued that production time has been reduced on sheets of five grades as a result of being able to eliminate stretcher leveling and re-squaring procedures. Also, he said, the scrap loss on re-squaring has been eliminated as the sheets are cut clean and square on the McKay line. Net effect of the installation was a definite increase in overall departmental efficiency.

H. J. Verner, chief engineer, remarked that the McKay roller leveler could process these grades of stainless, within its capacity, to flatness approaching that obtained from the stretcher method. He reported that the Die Shear Line is being used to prepare for shipping cold rolled sheet from 4″ to 48″ in width, up to .050″ in thickness, and in lengths from 36″ and greater at normal production speeds. He particularly likes the McKaymatic* Die Shear Line for its ability to handle high finish stainless without edge or surface damage.

Available in many sizes—The McKaymatic* Die Shear Line is available in sizes to accommodate most commercial widths. Composed of decoiler (with coil car, if desired), roller leveler, measuring device, and cutoff press, it satisfies most requirements for sheet length accuracy and squareness, flatness, edge and surface quality protection and output rate.

For short runs or long, the McKaymatic* Die Shear Line will better any other line in economy and efficiency. Whatever your cut-to-length problem, McKay Machine's engineers have a solution. Write for literature; send your specific needs for a quotation to *McKay Machine Company, Youngstown 1, Ohio.*

*TM

LOOK TO

McKAY McK MACHINE

FOR PROGRESS IN METAL PROCESSING

KEOKUK KONTROLS KUALITY
PIN YOUR COAT WITH KEOKUK The Kuality Kandidate
VOTE FOR CHIEF KEOKUK
BUTTON DOWN KOSTS WITH KEMCO
SOAP

Chief Keokuk hits it "right on the button" with Kemco Silvery . . . the superior form of silicon introduction! Declare yourself a member of the Kemco party and wear the Keokuk button. Back the Chief's platform of "Quality plus Economy" . . . write for free campaign buttons for yourself and your friends. And when you vote for Silicon . . . vote for KEMCO.*

KEMCO SILVERY PIG IRON

SILICON METAL – OTHER FERROALLOYS

Kemco Silvery melts uniformly for quality . . . holds silicon loss to a minimum for savings. Your choice of 60 lb. or 30 lb. pigs or 12½ lb. piglets in regular or alloy analysis for iron and steel production. Write for full information . . . get a copy of booklet, "For Lower Costs, Higher Quality Products." Also check the performance of Kemco Silicon Metal in aluminum.

Keokuk Electro-Metals CO.

Division of Vanadium Corporation of America

Keokuk, Iowa • Wenatchee, Washington

Sales Agent: Miller and Company

332 S. Michigan Avenue, Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

**You can also get Chief Keokuk buttons at the AFS Foundry Show, May 9-13, Philadelphia. Visit our interesting display!*

(*Concluded from Page* 96)

plant this spring. Plans call for factory space and offices totaling nearly 28,000 sq ft.

NEW OFFICES

Morgan Engineering Co., Alliance, Ohio, has formed a sales subsidiary **Crane & Mill Sales Inc.** to market heavy duty mill cranes, mills, and other allied steelmaking equipment. Offices are at 1754 N. Highland Rd., Pittsburgh 28, Pa.

Philips Electronic Instruments, Mt. Vernon, N. Y., a division of **Philips Electronics & Pharmaceutical Corp.**, opened a new office at 1299 Bayshore Highway, Burlingame, Calif. The office will assist in sales and service problems of Norelco Western dealers and handle service-contract work on the Pacific Coast.

Seibert & Sons Inc., Chenoa, Ill., manufacturer of production holding tools, tool control boards and spindle equipment, opened a factory branch office and warehouse at 18926 Schoolcraft, Detroit.

Ziegler Steel Service Corp., Los Angeles, has opened a Honolulu Div. at 615 Ahua St., Honolulu, Hawaii. The company will carry stocks and also represent manufacturers of steel and aluminum building products. Lee H. Burke is manager.

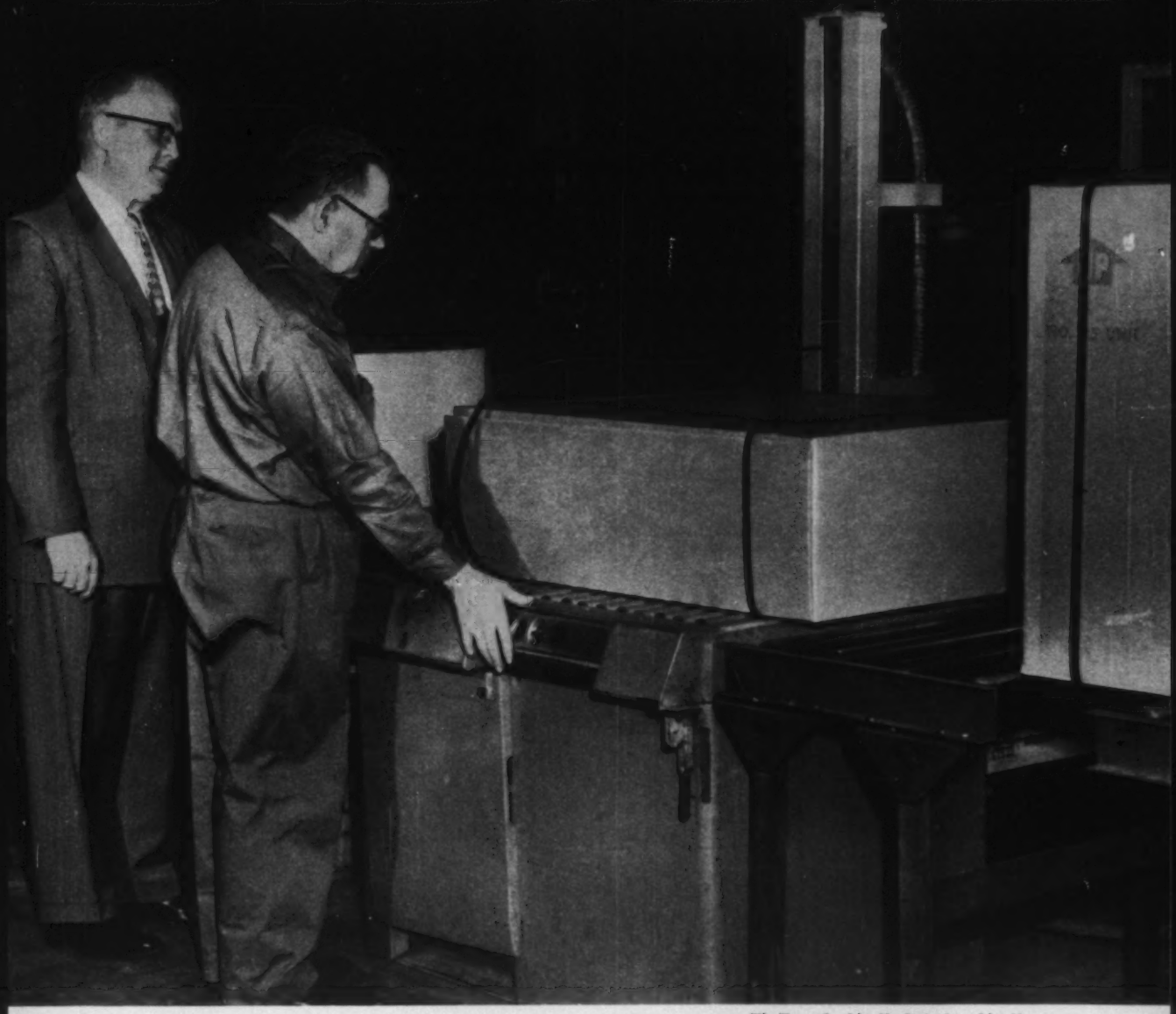
CONSOLIDATIONS

D. W. Price Corp., Los Angeles, and **Aviation Development Inc.**, Burbank, Calif., have consolidated personnel and manufacturing facilities. The new firm's name is **Avdel Inc.** Administrative, sales, and engineering offices, as well as manufacturing facilities are at 210 S. Victory Blvd., Burbank, Calif. Clare A. Mason is president.

Roth Corp., Lorain, Ohio, has purchased all patents, drawings, inventory, tools, and equipment from **White-Roth Corp.**, Lorain. The new firm will specialize in design fabrication of special process equip-

(*Please turn to Page* 104)

TAKES THE HEAT OFF SHIPPING SURGES



The Trane Co., Idea No. S1-6. Acme Idea Man John McEvoy (left) helped develop it.

This heating and cooling equipment manufacturer keeps in step with production swings and shipping demands with Acme Steel F1 Strapping Machines. By tensioning, cutting and sealing strap automatically, these machines have reduced man-hours 50% over previous manual operations.

Acme Steel Company, backed by the industry's broadest steel strapping application experience, has probably met and conquered many problems like yours. Call for more facts, or mail the coupon below.

ACME STEEL

IDEA LEADER IN

STRAPPING

ACME STEEL COMPANY
Acme Steel Products Division
Dept. SBS-40
135th St. & Perry Ave.
Chicago 27, Ill.

Please send me Idea No. S1-6 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

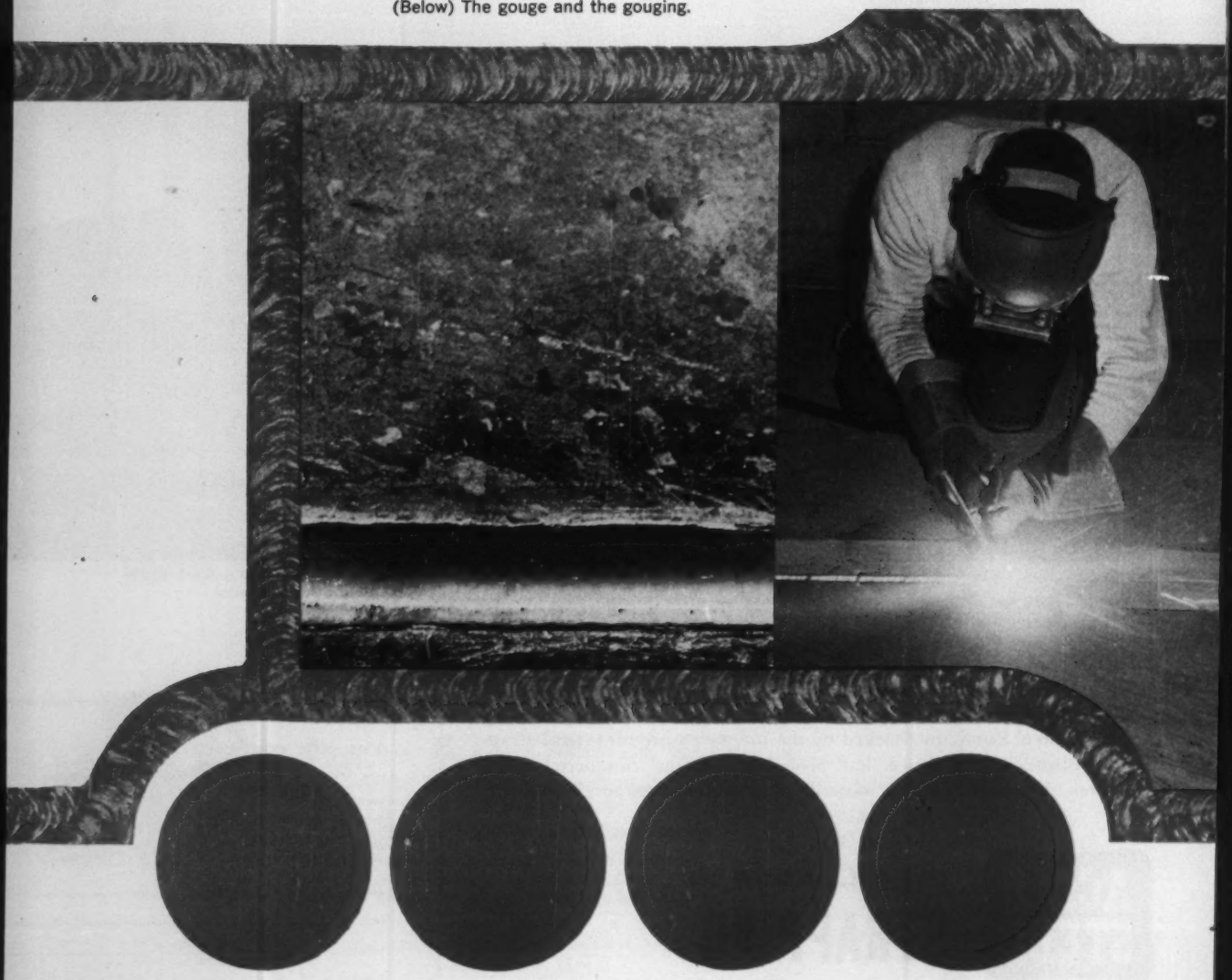
new Westinghouse WS silicon welder...

Arc-air gouging for metal removal offers an outstanding path to cost reduction. The new Westinghouse WS welder has been designed as the ideal companion to this process.

Weld or gouge—be SURE you do it with the 500-amp WS because, in addition to the natural advantages of a hermetically sealed, high capacity, silicon diode rectifier, it affords threefold protection.

Three automatic protection features eliminate the need for special precautions by the operator. First: an exclusive surge suppressor circuit to protect against transient voltage spikes. Second: an integral transformer thermal switch that prevents overheating with prolonged use. Third: an exclusive time and current sensing

(Below) The gouge and the gouging.



designed specifically for arc-air gouging, too!

relay circuit that prevents damage from the above normal current or above normal duty cycle.

You benefit with greater production and fewer repair bills. What's more, you have a dual-purpose unit that can both weld and arc-air gouge, a welder you can count on to work whenever you need it.

You can get other Westinghouse WS units with the same ruggedness and reliability. Capacities: 200, 300, 400 as well as 500 amps for 230/460-volt a-c operation.

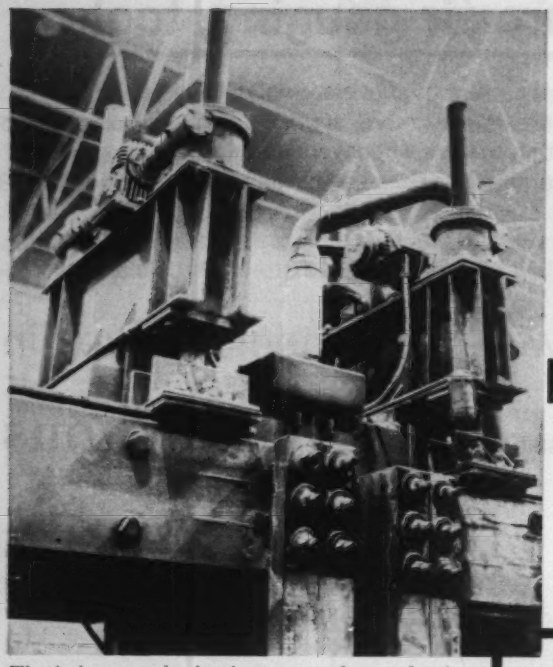
Want more information on the industry's newest, most versatile welder? Contact your nearest Westinghouse Welding Distributor . . . or write Westinghouse Welding Division, 4454 Genesee Street, Buffalo 5, New York.

J-10483

watch Westinghouse for new developments in welding!

YOU CAN BE SURE...IF IT'S **Westinghouse**

The new WS welder.



100 million pounds per year

That's how much aluminum a modern reduction plant equipped with 1000 Cone-Drive **double-enveloping worm** gearmotors produces. Gearmotors control anodes and casings on the electric furnaces. Ambient temperatures to 300° F and constant reversing are encountered.

Versatile Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Your ideal source for custom-designed cranes—CONCO

This unique installation combines a 2-ton, 38'5" span circular crane and a 20-ton, 24'2" span annular crane, each with a 130' lift. One engineering problem solved: On the annular crane the outside wheels must travel at 195 FPM; the inside wheels at 125 FPM. Conco builds cranes for virtually every class of service, including specialized spark and explosion-proof cranes, two-hook cranes, and cranes employing closed-circuit TV remote control operation. A complete design service, including sample specifications, is available. Write us for bulletin 500B covering the Conco line of cranes, hoists and trolleys.

CRANES HOISTS CONCO

Material Handling Division
Conco Engineering Works, Inc., 70 14th Ave., Mendota, Ill.
AFFILIATES: Spartan Tool Division—Powered Sewer Cleaning Equipment
Field Control Division—Barometric Draft Controls
Conco Building Products, Inc.—Brick, Tile, Stone

(*Concluded from Page* 100)

ment and machinery, as well as contract machining.

National Malleable & Steel Castings Co., Cleveland, has agreed to buy the **Hubbel Div.** of **General Pacific Corp.**, San Francisco, subject to the approval of the seller's shareholders. The disclosed cash purchase would involve about $3 million. The division has headquarters in Cleveland and plants in Youngstown and Lorain, Ohio; Hammond, Ind.; Napa, Calif., and Denver.

Victor Equipment Co., San Francisco, has acquired **L. B. Welding Equipment Co.**, Berkeley, Calif. L. B. Welding makes automatic rebuilding equipment sold mainly to tractor dealers to rebuild tractor links through welding.

Electro Switch Corp., Weymouth, Mass., purchased the assets of **Electro Contacts Inc.**, Osterville, Mass. The new division makes telemetering switches, brush blocks, commutators, and slip ring assemblies.

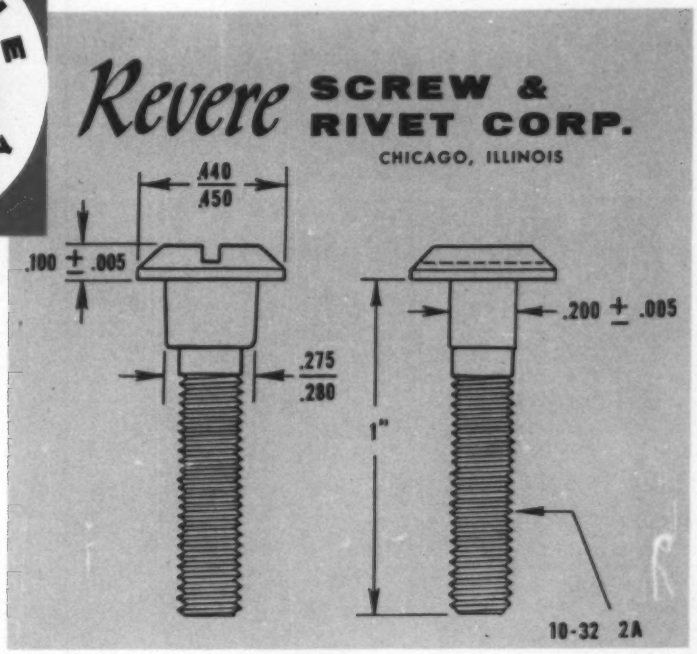
ASSOCIATIONS

Engineers Joint Council, New York, has launched a newspaper, *Engineer*, for its members. The council is a federation of 21 engineering societies with a total membership of 300,000.

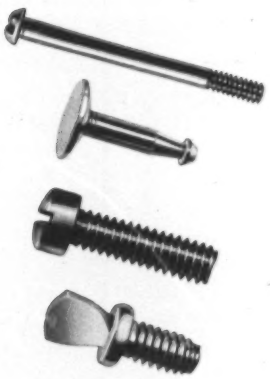
American Powder Metallurgy Institute has established a Philadelphia section. The institute is the technical division of the **Metal Powder Industries Federation**, New York, and was recently opened to individual membership.

American Zinc Institute, New York, re-elected R. G. Kenly, New Jersey Zinc Co., president. Re-installed as vice presidents: T. A. Campbell, Anaconda Sales Co., New York; H. D. Carus, Matthiessen & Hegeler Zinc Co., La Salle, Ill.; E. H. Snyder, Combined Metals Reduction Co., Salt Lake City, Utah. Elected treasurer, G. H. LeFevre, U. S. Smelting & Refining Co., New York; as executive vice president and secretary, J. L. Kimberley, New York.

KEYSTONE XL WIRE STUDY



ACTUAL SIZE



heading problems solved *with Keystone XL Wire*

The cold heading of this generator shoulder bolt required extreme flow of material in concentric shapes, two diameters to be struck in one blow. Specifications were a rigid .005 tolerance. Because of the *flowability* characteristics of Keystone "XL" Wire, Revere Screw & Rivet Corp. have been able to produce this complicated fastener at high production rates and economical costs.

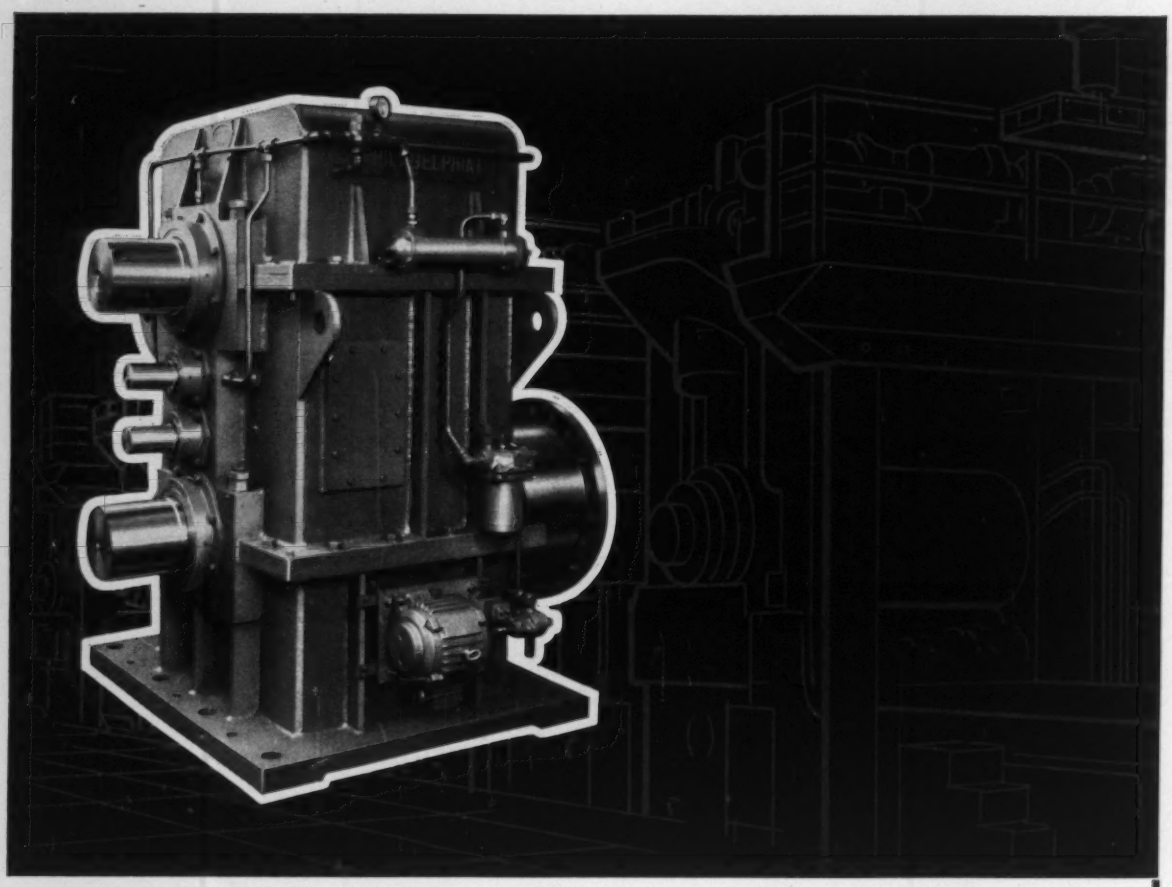
Revere president, Sol Gross, credits the uniform size and quality of Keystone "XL" Wire for increasing production, waste elimination and long die life. In fact, a three-fold increase in die life was realized.

Your cold heading problems can be simplified and solved when you put the *flowability* characteristic of Keystone "XL" Wire through your dies. Ask our Keystone wire specialists for complete information.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE WIRE FOR INDUSTRY

IMPROVED GEARS = { MORE POWER + LONGER LIFE }



This rolling mill pinion stand is a typical example of how Philadelphia Precision Ground Gearing is revolutionizing large mill drives.

Radically improved gear accuracies reduce dynamic load factors . . . gearing has increased load carrying capacity. Result: you can save space, increase speeds, transmit more power and get longer life. And in most instances, Philadelphia can furnish precision ground gear drives at no greater cost than conventional and special drives now being used.

Philadelphia Precision Ground Gearing for heavy duty applications is the most important advance in power transmission in the last decade. It is a major breakthrough in gear manufacturing technology. So advanced in fact, that conventional standards have become out of date overnight. Now you can solve drive problems you could never solve before . . . because you have advantages that were never available before.

For complete information, write today for our catalog on Precision Ground Gearing.

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philadelphia gear drives

HOT FORMING WITH A BANG— Metals with excessive springback or which tend to crack during sudden, severe deformation can be explosively formed by heating them first, says Ryan Aeronautical Corp., San Diego, Calif. The unusual technique was described at a Society of Automotive Engineers meeting in New York. Instead of a water medium, Ryan uses extremely fine glass beads to prevent chilling of the metal. Results are excellent and predictable, stated E. E. Mellinger, Ryan representative, who exhibited an 8 in. titanium hemisphere to illustrate results.

PUSHBUTTON, GEARLESS TRACTORS— Farmers, construction men, and industrialists are going to sit back and take it much easier when plans materalize for hydraulically or electrically propelled tractors. They will probably be controlled by electrical pushbutton systems. Both Electric Autolite Co., Toledo, Ohio, and International Harvester Co., Chicago, are probing possibilities.

'STANDARDIZE FORK TRUCKS'— That's what officials at General Motors Corp., Detroit, are asking makers of industrial trucks. Reason: To make them more suitable for GM plants. Main items in the beef: Batteries, battery compartments, mast heights, face plates, backup flashers, and similar safety items.

REFRACTORY MUSCLE BUILDING — Proper dispersion of fine particles in refractory alloys multiplies strength 5 to 20 times, claims K. M. Zwilsky, research director, New England Materials Laboratory, Medford, Mass. In his opinion, such alloys are superior to the best age hardened alloys for high temperature resistance.

'NO HANDS' HANDLING— Automatic handling systems for warehouses are becoming increasingly popular. Examples: A Portland dock, 1600 by 900 ft, is run by only six men with remote TV who control conveyorized carts which receive ships' cargo; plug-in components made by Control Design & Equipment Mfg. Inc., Detroit, control all operations in the Abner Wolfe warehouse, Detroit; Oldsmobile Div., General Motors Corp. has started to buy electronically controlled Guide-O-Matic trucks for its Lansing, Mich., warehouse.

MORE EFFICIENT POWER LINE— American Electric Power Service Corp. and Westinghouse Electric Corp., Pittsburgh, are trying to improve power transmission efficiency by upping transmission voltages. A 750,000 volt line will be tried out at Apple Grove, W. Va.

VACUUM PUSHES ROCKETRY—The tremendous improvements imparted to alloys by vacuum melting permit rocket designers new freedom in building rocket cases, states Dr. John C. Hamaker Jr., director of research and metallurgical engineering, Vanadium-Alloys Steel Co., Latrobe, Pa. On May 2, he will discuss properties and characteristics of some experimental alloys above 300,000 psi (ultimate) at the Southwestern Metal Congress, Dallas.

DIECASTING IS AUTOMATIC— A new indexing-head diecast machine casts four letters of the Chevrolet name (to be affixed to cars and trucks), then indexes and trims, indexes and loads, says an American Zinc Institute source. It will help a GM division meet 1961 production schedule of 33 million letters. Production rate: 700 letters an hour.

VALVES GET SMALLER— A new subminiature hydraulic valve for future space craft is smaller than a golf tee, says the maker, Electric Autolite Co., Toledo, Ohio.

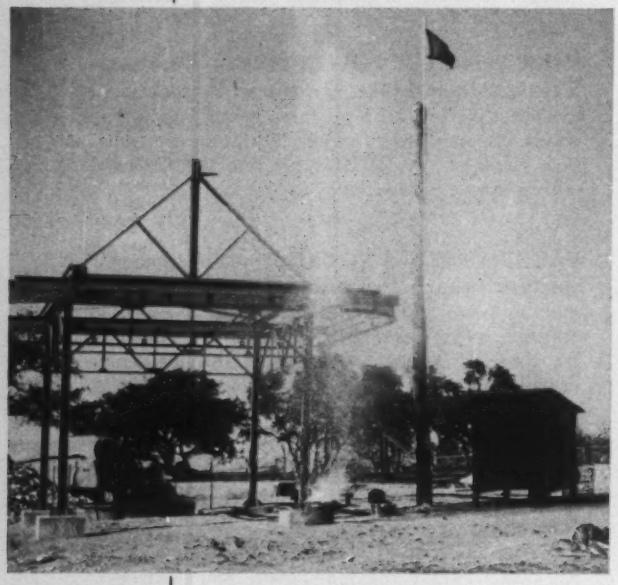
COLUMBIUM'S NEW HELPMATE— A coating of zinc-columbium improves columbium's poor oxidation resistance, says G. Sandoz, Naval Research Laboratory. Protection lasts several hundred hours at 1800° F and from a few days to a few hours between 2000 and 2200° F. Coating can be applied by dipping columbium into molten zinc.

How You Can Use High Energy Rate

Here are graphic progress reports on four Spage Age production processes that offer design engineers a new degree of freedom. The processes: Explosive forming, hydroelectric forming, pneumatic-mechanical forming, and closed cavity extrusion molding.

"Each method of high energy rate forming has its own area of application," E. W. Feddersen told Society of Automotive Engineers at a New York meeting. (He's chief of manufacturing research and development, Convair Div., Ft. Worth, Tex., General Dynamics Corp.)

Mr. Feddersen added: The techniques should be applied only when:

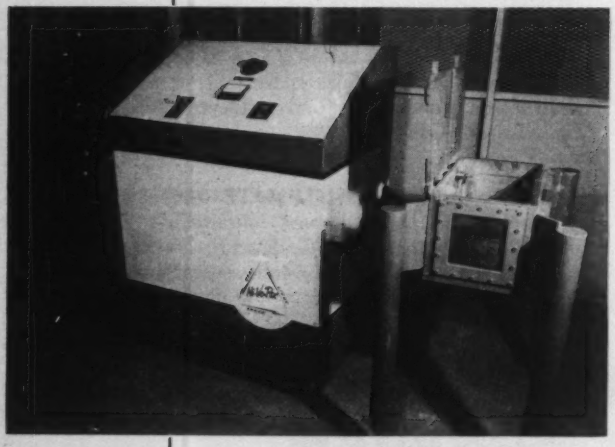


Explosive Forming

DEFINITION: An explosive charge sends a shock wave (which creates hydraulic action) against a metal surface to shape it. Water is normally the transmitting medium.

EVALUATION: This, the forerunner of high energy techniques, is in production. It offers the ability to form and size large, complex sections at fractional tool costs and eliminates large machinery, says Mr. Feddersen.

USES: Convair engineers say cup shapes and the expansion of hollow parts are the most economical applications. The method can also be used to form channels or panels.



Hydroelectric Forming

DEFINITION: With this technique, described as underwater lightning, electrical energy is stored in capacitors, then released suddenly. As in explosive forming, energy is applied through water.

EVALUATION: Compared with explosive forming, the process is more controllable and repeatable, and it can be used inside a factory.

USES: You can use it to form cup shapes, channels, or panels, and expand hollow parts. Convair's Hi-Vo-Pac (power supply at left, work tank at right) expands and sizes hollow bodies.

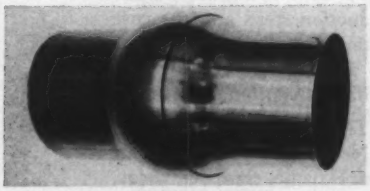
Forming

This is a nontechnical report for managers who want the latest word on four new processes: Explosive forming, hydroelectric forming (on these pages), pneumatic-mechanical forming, and closed cavity extrusion molding (Pages 110-111)

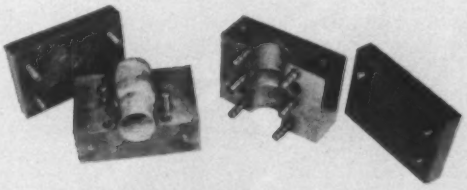
1. The job can't be done any other way.
2. The finished product is better physically.
3. When the product can be produced more economically than by conventional methods.

As you'll note in the following reports, a lot of progress has been made, but in Mr. Feddersen's opinion, there's still plenty of room for improvement. Needed are:

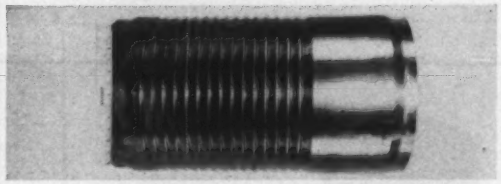
- Better handling techniques.
- Higher property die steels.
- A new concept for quick opening dies.
- More information, so rules can be established.



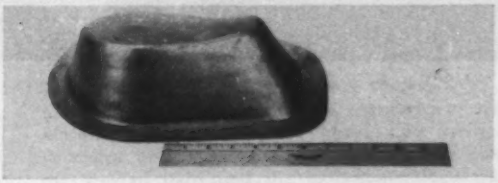
Two precut lengths of 301 annealed stainless steel tubing (an end of one piece nested inside the other) were converted into this uniform semi-airtight ball



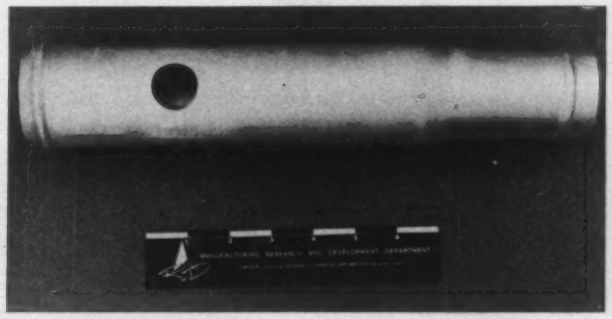
joint. With the tubes in the die assembly (also shown), a light charge of prepackaged gun powder is inserted in the tube and detonated



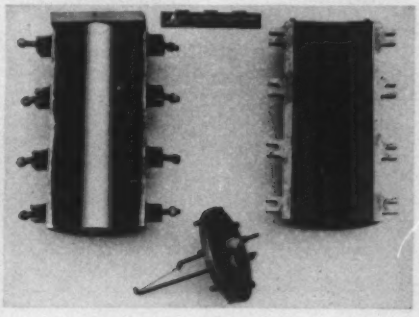
This is a cooling shroud for a ramjet engine. A 310 stainless steel sheet was preformed and welded. It was then put in the die, and a cylindrical charge of PETN explosive, 2 in. in diameter and 9 in. long did the forming



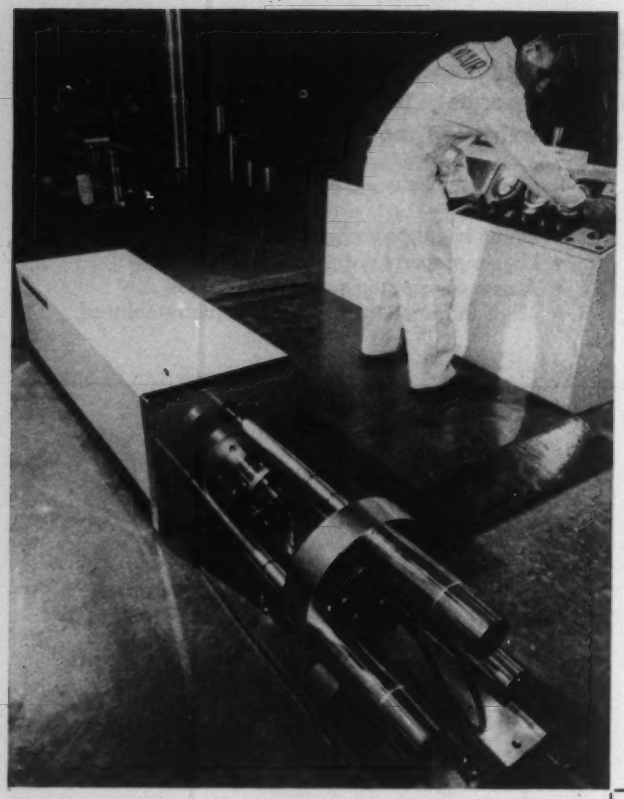
A succession of multiple strikes on a drop hammer (and intermittent anneals) were used to form this irregularly shaped cut. Explosive forming has reduced the number of strikes from five to three and the anneals from four to one



Beading, expanding, and piercing were done on this part in 6 seconds by a high energy spark (4000 volts, 1200 microfarads). The split epoxy die is closed and the bottom plate installed. The tube is then put in



the die cavity, the tube filled with water, and the cover plate with electrodes and initiating wire is installed. Leads from the power unit are connected, and the button is pressed

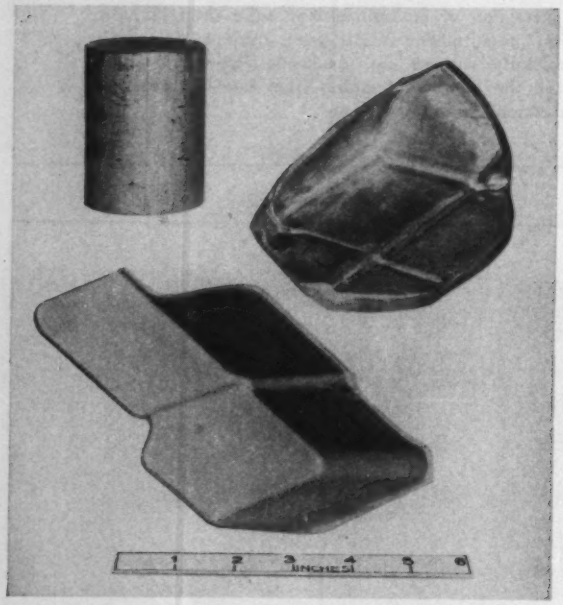


Pneumatic, Mechanical Forming

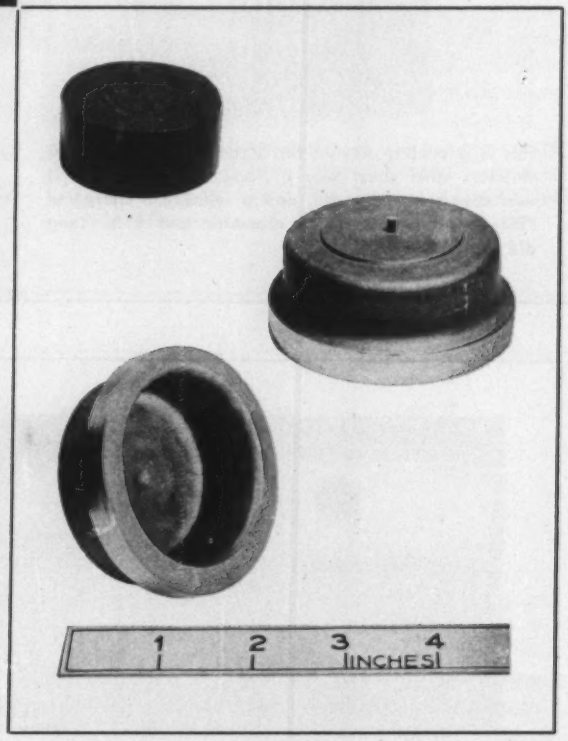
DEFINITION: Energy is stored as a compressed, dry nitrogen gas which drives a piston and ram against the workpiece at extreme velocities (say 600 in. a second).

EVALUATION: The process eliminates production steps and the cost of conventional tooling. Also, you can make some shapes that aren't feasible with conventional methods.

USES: The Dynapak machine (STEEL, Nov. 3, 1958, p. 41) can forge, form, extrude, compact, shear, and blank.



The gastight corner (far right) is for Convair's 880 jetliner. It used to be machined from a 4 lb 10 oz blocker forging to a finish weight of 10 oz. Now the 2014 aluminum part is formed from the slug at left with two strikes. The only machine needed trims flash and drills the attach holes. Mr. Fedderson reports it used to cost $7454 to tool up and $51.60 to machine each piece. Both costs are eliminated



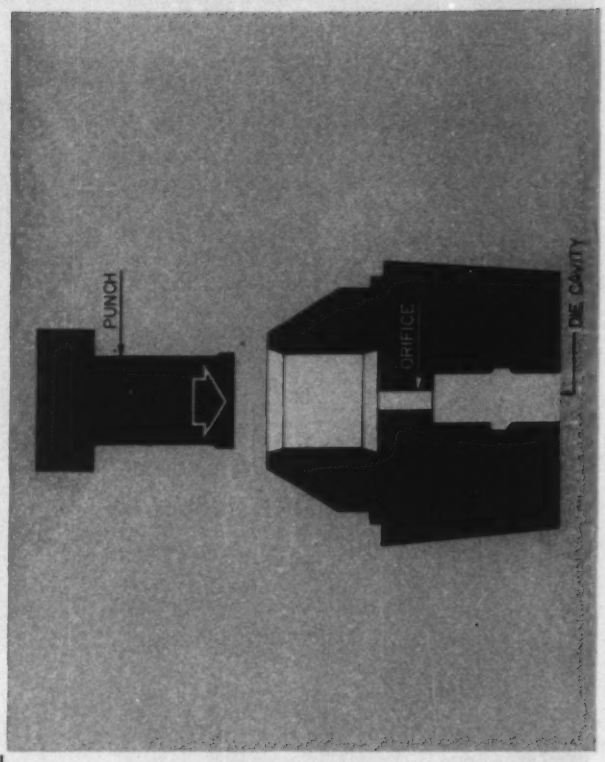
This 19-9 DL stainless steel part used to be machined from a blocker forging. It's now made on a Dynapak at Precision Forge Co., Los Angeles. Raw material costs dropped from $3.20 to 84 cents per part. Tooling costs were reduced from $1200 to $600, and machining operations were cut from seven to two. Result: An over-all saving of 75 per cent

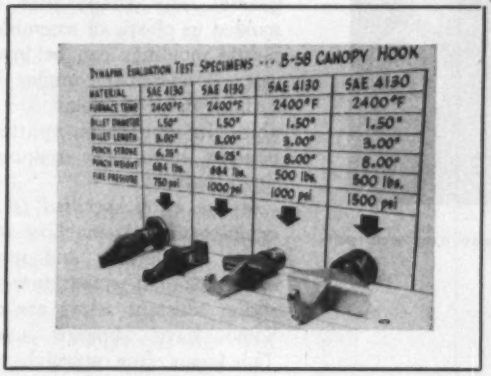
Closed Cavity Extrusion Molding

DEFINITION: This modification of the Dynapak process forces metal through a small orifice into a contoured, vented die cavity. It has been likened to steel diecasting, although the metal is worked in a plastic instead of a molten state.

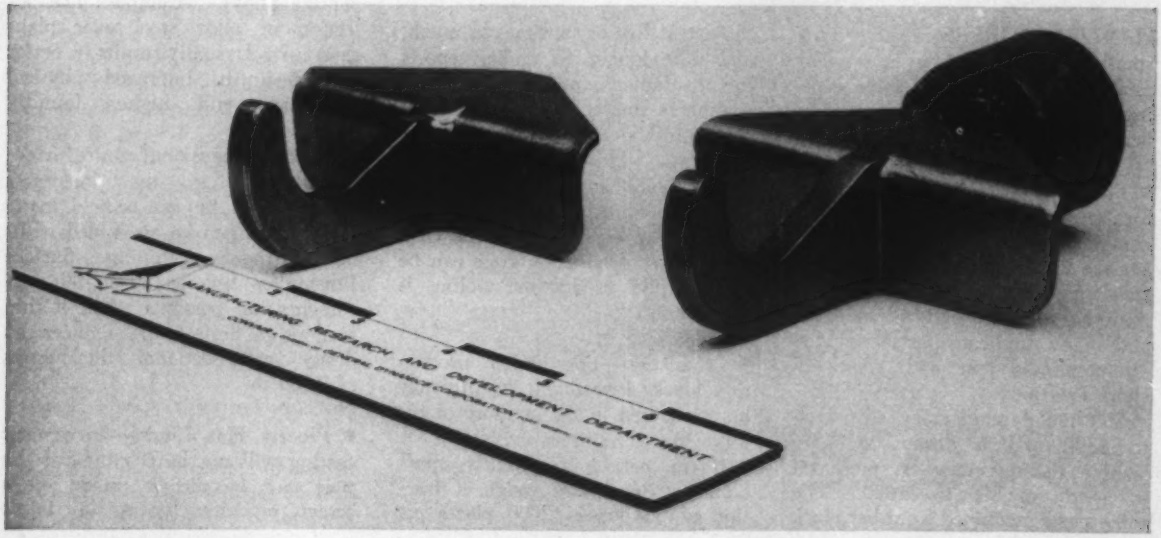
EVALUATION: The process is in the early development stage, but Mr. Feddersen predicts its success. Researchers are still looking for the right die steel.

USES: It promises to deliver "parts born to shape."



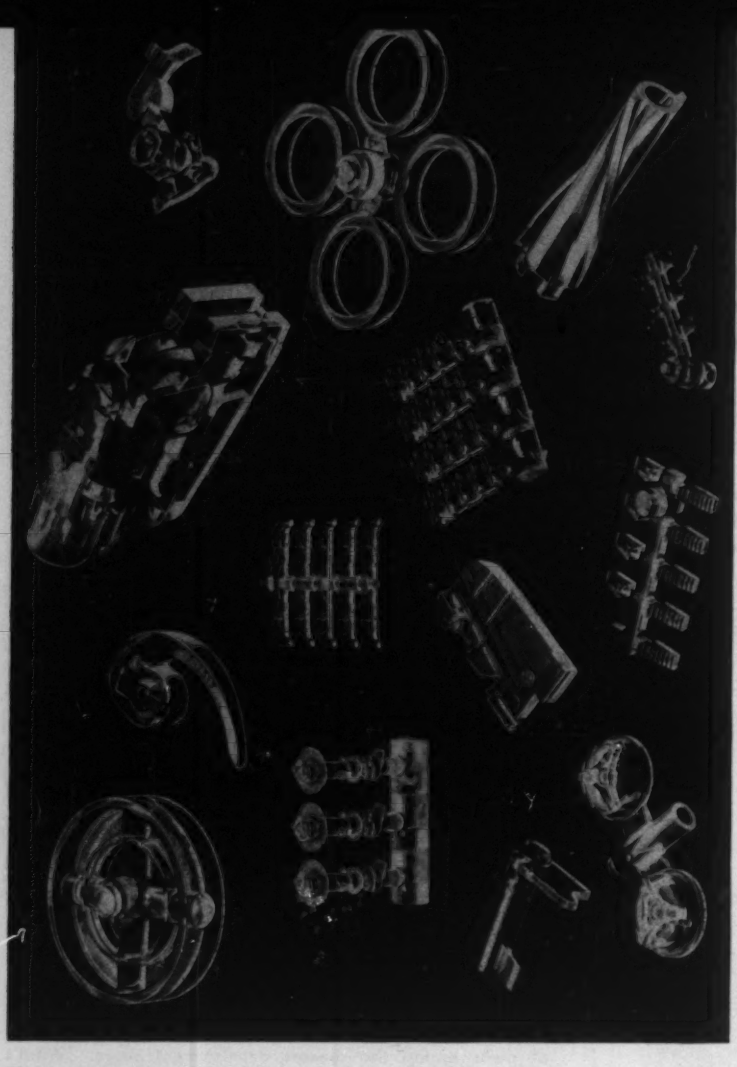


The B-58 canopy pod hook was chosen as a test part. Material: AISI 4130. Previously, the part was made in two pieces (the flange and the hook), then welded. Some structural problems were encountered. The photo shows the welded (left) and the extrusion-molded parts. (The slug was heated to 2300° F.) Also shown, the succession of parts during the process development stage. What's needed to make the process a producer: A die steel that's tougher, more abrasion resistant, and has greater thermal shock resistance and elongation



Lost Wax Practical

Method is found economical in making complicated prototypes and in preliminary production runs while production tooling is being built



Plastic patterns used by Casting Engineers Inc. The company also uses wax patterns for some of its conventional investment casting

MANUFACTURERS requiring small parts are finding investment casting increasingly suited for making prototypes and in production work.

● **Prototype**—The process is tailored for producing prototypes where complicated parts require a good surface finish and dimensional control. A soft metal mold (e.g. aluminum) for wax patterns is made and many duplicate parts produced at reasonable cost with relatively short leadtime.

Soft metal molds may cost $150 to $300 and a dozen or more sample castings may be produced at a cost of $50 to $1000. The same parts machined from bar stock could cost five or six times as much, and take longer to make, reports Joseph Cadieux, president, Casting Engineers Inc., Chicago, a division of Consolidated Foundries & Mfg. Co.

The advantage is twofold: The part can be evaluated and changes made in design at reasonable cost; preliminary production runs can be made while production tooling is being built.

● **Production**—For higher production levels, investment casting may be considered if one or more of the following conditions exists:

If the part is reasonably small. Some castings may weigh a fraction of an ounce (2000 pieces per pound), most weigh less than 2 lb and measure less than 5 to 6 in. Increasing the size reduces the economic advantage because it lowers the number of pieces per cluster. Mold casting and forging should be investigated for larger pieces.

If the part is complicated. In general, any shape that can be molded in plastic or assembled from plastic moldings can be investment cast. Undercuts, complex internal coring, and fine detail are obtainable. In some cases, multiple components have been reduced to a single casting.

If the alloy specified is difficult or impossible to machine or fabricate. All ferrous and nonferrous as well as high temperature and corrosion resistant alloys are castable. Some have superior castability. This factor often outweighs the price differential in choosing more expensive alloys. Example: The selection of alloy steel over plain carbon steel usually results in better surface finish, improved physical properties, and higher foundry yield.

If close dimensional control is desired. Due to the tolerances (±0.005 in.) that can be held, many components can be assembled without further machining. Surface finishes as fine as 60 to 90 microinches are possible. And if thin sections are desired, the engineer can design cross-sectional thicknessess of 0.050 in.

● **Process Has Limits**—Investment casting will not be economic if the part can be diecast, made on a screw machine, or as a simple

Process Emerges As Tool for Small Partmakers

stamping, sand casting, or forging with little secondary machining.

• **Thumbnail Description**—For each casting produced, a consumable pattern of low shrink wax or polystyrene plastic is made. The patterns are assembled into a cluster or tree and joined through a system of gates and runners to a cup which is used as a pouring basin.

The cluster is dipped into a paint-like dispersion of fine mesh refractory in a solution of siliceous binder (colloidal silica or ethyl silicate) to duplicate the details of the wax or plastic pattern.

After the cluster has received several coats, it is inserted in a flask and covered with a slurry of refractory material. The mold is then fired at 900 to 1900° F for 6 to 18 hours, during which the pattern melts or vaporizes, leaving a cavity for pouring.

The metal is poured in and after it solidifies the mold is destroyed and the part removed.

A recent modification called monolithic or shell casting repeats the process through the dip coat operation. From this point, the mold is completed by applying additional dip coatings and progressively coarser refractory grains until a shell 3/16 to ½ in. thick is built up. After thorough drying, the wax is removed and the shell fired at 1800 to 2000° F.

• **Tip to Engineers**—While almost any shape can be investment cast, certain basic design features should be followed to eliminate production problems and reduce costs:

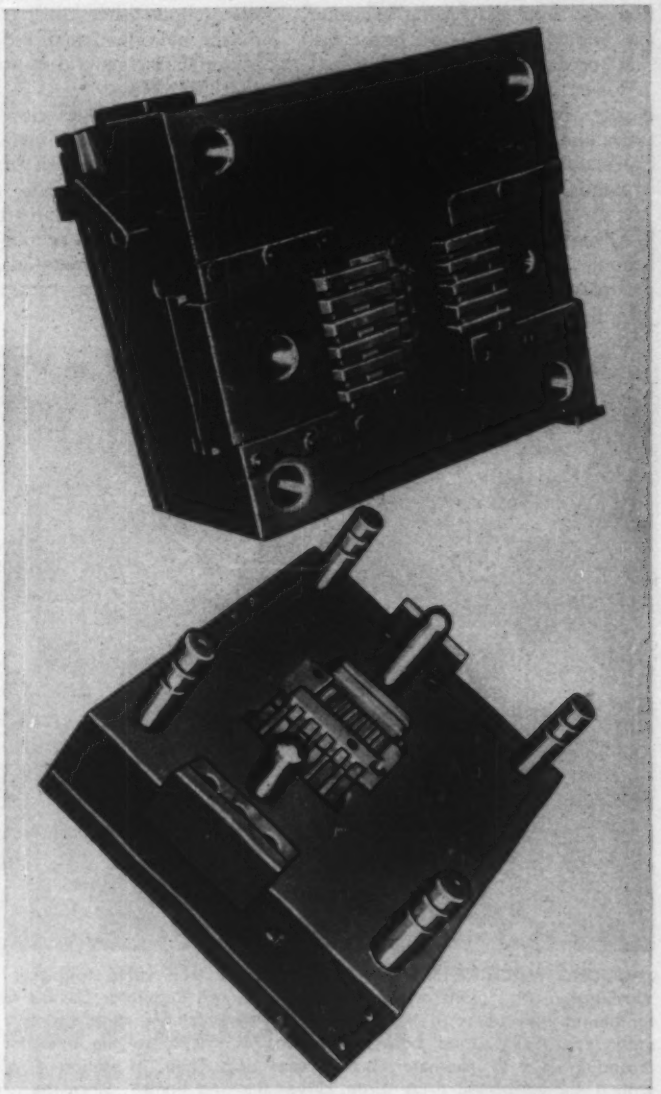
• Allow for generous radiuses (1/32 in. minimum) and avoid sharp corners.

• Avoid abrupt thickness changes; they complicate gating.

• Consider well whether to cast or drill holes. Decision depends on such factors as dimensional tolerances, wall thickness surrounding holes, or difficulty of drilling.

• Threads can be cast but unless alloy is unmachinable there is no economic justification for doing so.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.



Dies used in making plastic patterns for high volume production

Your Machining Setups May Be Obsolete

Expert says that new degrees of metal cutting efficiency have been made possible by ceramic tools, better high speed steel cutters, and titanium carbides

THREE major trends in cutting tools are helping production men step up their machining efficiency via better tool life at faster cutting speeds.

Robert T. Hook, chief metallurgist, Warner & Swasey Co., Cleveland, cited the trends at a Cleveland meeting of the Society of Automotive Engineers.

• **Advent of the Ceramics**—"You benefit from the introduction of ceramics . . . by using them, or from the stimulus created by faster cutting speeds, or the effect on the research of other cutting materials, or the modification of older cutting materials for general improvement," said Mr. Hook.

He feels ceramics have found a niche in four major metal removal areas: 1. As a finish turning tool for uninterrupted cuts at higher speeds. 2. For hard materials that resist cutting by other tool materials. 3. For abrasive materials, such as cast iron, where ceramic's high wear resistance becomes important. 4. For machining materials with hardnesses of 40 Rockwell C, or higher, on which "turning has replaced grinding in many cases."

• **High Speed Steel**—Mr. Hook referred to "the super-high-speed steels, such as the T-15 and M-4 types, which include high quantities of vanadium and cobalt."

The chief advantage of those materials, he feels, is their potential for a greatly increased number of pieces machined per tool grind. Another plus: Speed can be boosted on many jobs.

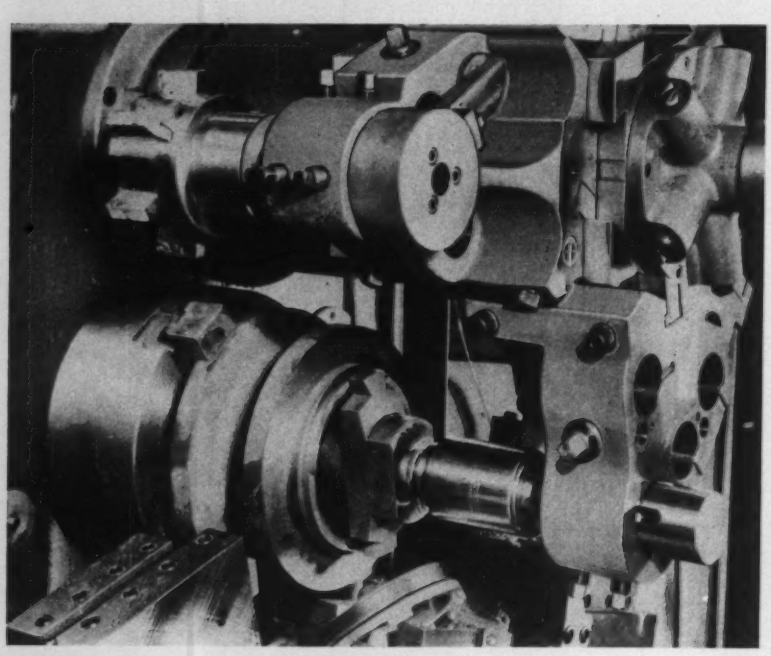
"The materials offer two to six times as many parts per grind as the standard 18-4-1 operated at the same speed. On the other hand, speeds can be increased by as much as 50 per cent with the newer types of high speed steels with the same number of pieces per grind as the older types of cutting tools."

Mr. Hook also credits tool life increases of 50 per cent or more to a process that deposits tungsten carbide in the high wear areas of high speed steel tools.

• **Titanium Carbide Gains** — Mr. Hook says cutters made of this material offer the possibility of faster cutting speeds, and they have greater impact strength than the ceramic tools.

Thirty per cent titanium carbide used to be considered maximum content for a successful tool, but a new carbide that has 64 per cent titanium carbide bonded with nickel or molybdenum indicates: "We have had a breakthrough in technology . . . in the range of approximately 1000 surface feet a minute, it is quite competitive with ceramics," says Mr. Hook.

In tests, another tool, with 80 per cent titanium carbide, has been shown to be about six times as wear resistant as competitive ceramics.



CHUCKING MACHINE SPEEDS OUTPUT of cast iron valve tailpieces at the Ft. Washington, Pa., plant of Minneapolis-Honeywell Regulator Co. It's the result of combining operations in this Warner & Swasey single spindle unit. The automatic cycle is stopped between stations 3 and 4, so the operator can start threading a 6 in. diameter, bronze seat ring. Then, in station 4, a tap chuck with a spring loaded drive plate, drives the ring home. Since the ring is finish machined in place, concentricity is also assured

Sample pages from A-L's new free booklet on design

"Design and Allegheny Stainless" is illustrated page after page with hand-picked examples of good design in the gleaming metal.

Twenty-four photographs and drawings in full color, twenty-six in dual color and black and white become a showcase of the versatility of stainless.

The examples are presented with text in terms of Function, Shape, Texture and Color. They cover many fields from automotive parts to holloware for the home . . . to open new horizons for the designer.

There is a working outline of types and properties in the many grades of Allegheny Stainless. Some of the new textures illustrated will interest the designer looking for new effects.

Write for your copy of "Design in Allegheny Stainless Steel"—without cost or obligation. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-4-2.*

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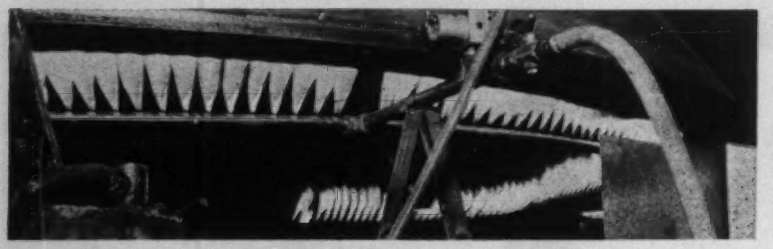
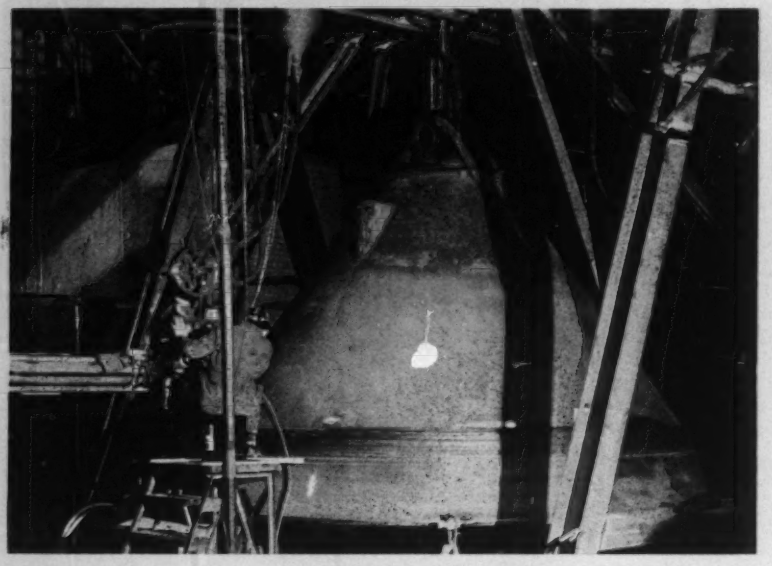


After machining, the bell is preheated by a custom built gas burner . . .



. . . then a hard weld bead is spiraled on the area that gets most wear

Blast Furnace Bell, Hopper Hard Surfaced by Welding

USE of more abrasive materials in the blast furnace charge is forcing steelmakers to put longer wearing surfaces on bells and hoppers.

Resurfacing of the worn parts is done at Bethlehem Steel Co., Bethlehem, Pa., in the company's shops.

R. C. Mahon Co., Detroit, is resurfacing the bell and hopper of a big stack operated at Zug Island, Mich., by Great Lakes Steel Corp., Detroit, a division of National Steel Corp.

• Fixtures were designed to hold the parts during preheating, machining, and welding.

The 30 ton hopper, which is about 12 ft high and 18 ft in diameter, lies on its side, on rollers, for machining. It is suspended above the floor for resurfacing.

The bell, 16 ft in diameter and about 10 ft high, is suspended above the floor and machined to restore its cone shape. (The parts are usually warped by blast furnace heat.)

A gas fired heater under the bell brings metal up to 400° F for welding. That temperature must be maintained or the metal will crack, says Douglas Truman, assistant general manager of R. C. Mahon's Steel-Weld Div. Preheating takes 36 hours; finished parts are allowed to cool naturally.

• Conventional welding brings worn spots back to their original thickness. Then a hard coating is applied.

Worn surfaces are rebuilt by welding; Lincoln Electric L201 wire rods and 760 flux are used. Then a hard welded coat is applied with a high nickel alloy rod—Lincoln Electric L60—and H550 flux.

Conventional submerged arc welding equipment applies the hard surface bead at about 33 in. per minute. Some time was spent in developing techniques for applying the metal, says Mr. Truman.

The surface is applied in a band about 18 in. wide on the hopper inner wall. Reinforcements, or surface welds, are also made on the parts where they fit together. Hard surface material is applied to the bottom of the bell in a path about 30 in. wide. The material has a hardness of 45 to 50 Rc.

• The company developed tooling heads to mill and grind the parts, using conventional equipment.

Mating surfaces of the bell and hopper must match well enough to prevent escape of blast furnace gases. Final beads are vertical milled and finish ground with conventional carbide tools.

The bell must be balanced with counterweights positioned within 1/32 in. of its conical surface, so it will fit properly in the furnace top.

A typical resurfacing job is expected to take about five weeks when the right procedures are established, says Mr. Truman.

• Hard surfaced parts are expected to last through the blast furnace campaign.

Great Lakes Steel anticipates using the bells and hoppers for the life of the blast furnace lining—usually four to seven years. Parts lasted that long previously when conventional charge material was used. But greater abrasion from sintered material is expected to wear them out sooner, so new bells and hoppers will be surfaced before they are used.

550,000 POUNDS OF PRECISION

The Guillotine Shear's superior cut on heavy gauges, synchronized on the fly

Another Hallden First — type 76 Guillotine Flying Shear, the world's largest, for continuous strip shearing — up to 5/8" thick, 100" wide aluminum — at ***two cuts per second.*** This new Hallden installation can cut mild steel up to 3/8" thick and 90" wide, with cut lengths infinitely variable up to 48 feet. Change of cut length and synchronization may be made while the Shear is in operation. For every high-production shearing application consult the shearing specialists.

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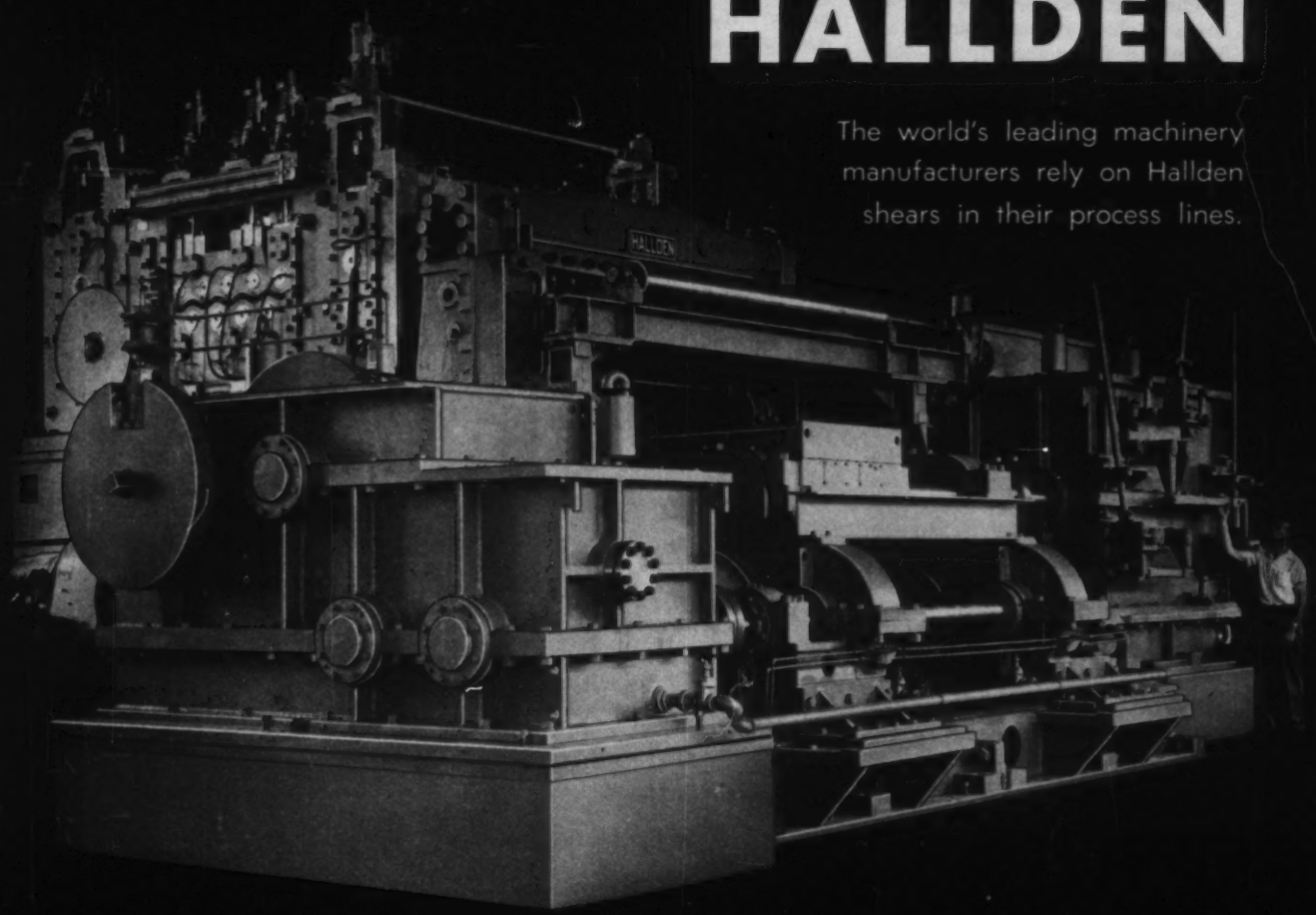


THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

New Tool Steel Selector Program Aids Warehousers and Users

MOST of your tool steel applications can be adequately handled with only a few grades, says Milton M. Fenner Jr., director, tool steel sales of Allegheny Ludlum Steel Corp., Pittsburgh.

The company has set up a program to aid users in choosing from preferred grades on the basis of required properties. It's based on studies of purchases by many users over a period of years. The system is said to handle 96 per cent of the applications listed in the company's tool steel handbook.

Literature for the program lists grades recommended for specific areas (eight cover the toolroom applications, for example). Grades are compared in terms of their properties.

• The system aids the user in choosing the best steel for a particular application.

The application determines the properties necessary for optimum performance. Allegheny Ludlum's program will help the buyer select the steel with the right combination of characteristics without a long (and sometimes confusing) search through handbooks, says Mr. Fenner.

The user may obtain a selection device—called the Steelector—based on his needs. How it works: Say he wants a steel high in abrasion resistance, but appreciable shock resistance is also important. A glance at the card will show what compromises must be made with abrasion resistance to satisfy his other requirements.

The approach has been used in the company's handbook for over a decade.

• Grades, sizes, and availability are outlined in the literature.

Specifiers and users of tool steel can decide on a particular grade and be sure it is available in the needed quantity. Previously, a prospective user couldn't ascertain availability of a size until a grade was chosen and an order placed. If, for example, the size specified could be obtained only on a mill order basis, the user would have to go back through the steps in the selection process.

• The simplified setup for stocking and selection will satisfy most needs with a relatively few grades.

Concentration on a few versatile performers permits an increase in mill depot and warehouse stocks of the most used sizes and grades and cuts users' inventory requirements. It also reduces handling costs and should ultimately make for lower selling prices.

• Efficient selection and procurement can help hold down the user's costs.

Tool steels are never cheap to produce. They are made in small furnaces and rolled in relatively small batches. They must be processed, stocked, and distributed in relatively small lots. Odd sizes and little used grades cause over-all prices to remain high.

The Steelector program familiarizes the user with grades and sizes that can be produced at the lowest possible cost and offered at the lowest price, says Mr. Fenner.

• Too many grades confuse the user and boost production costs.

About 300 tool steel applications are listed in Allegheny Ludlum's tool steel handbook. More than three times that many brand names

Large warehouse stocks of standard tool steels make for faster deliveries

Selection is made easier by concentration on a few grades that handle 96 per cent of all applications; the system also insures more complete stocking of preferred grades and sizes

are offered by American producers and distributors. The availability of so many grades is often questioned by the user.

Small analysis variations, intended to yield extra performance, aren't always justified. Addition of 0.15 per cent copper or 0.25 per cent nickel to a heat of steel may not make an appreciable performance improvement in the average machine shop or tool shop applications, says Mr. Fenner. Special heats and special handling also make for higher prices.

• Toolroom grades are compared graphically on one selector card.

The grades have varying degrees of abrasion resistance, toughness, size stability, machinability, and red hardness. They were chosen for the broadest possible coverage of general purpose applications.

Grades included: One oil hardening and one air hardening, high carbon-high chromium die steel; a medium alloy, air hardening steel; an oil hardening, graphitic die steel; two comparable manganese, oil hardening die steels; a silicon-manganese and a tungsten-chromium, shock resisting steel; and two water hardening grades.

Characteristics of the toolroom grades are shown in bar chart form, for quick comparison. The absolute value of a particular property, such as abrasion resistance, isn't given; but it is a simple matter for the prospective user to ascertain the relative levels for all grades.

• The bar chart helps determine the best over-all balance of listed properties.

To select a steel for an application, the user examines the selector chart, looking for the property most important to him. Example: For lamination dies, requiring the most possible abrasion resistance, he would note that Huron (an oil hardening, high carbon-high chromium die steel) has the longest bar for that property, and he might choose that grade.

But other properties might also be important. If the dies are to be subjected to shock, he might want more than the minimum toughness offered by the oil hardening grade of high carbon-high chromium. He might compromise slightly on abrasion resistance and choose Ontario (an air hardening, high carbon-high chromium die steel with good hardness, abrasion resistance, and size stability).

• Selector charts are also available for hot work or high speed grades.

The procedure for selecting hot work or high speed steels is the same as for the toolroom grades. Grades included on the hot work Steelector: A high tungsten type, a tungsten-chromium-cobalt type, a 9 per cent tungsten type, a 5 per cent chromium-molybdenum-tungsten type, and a 5 per cent chromium-molybdenum-vanadium type. The group is said to offer all important high temperature properties.

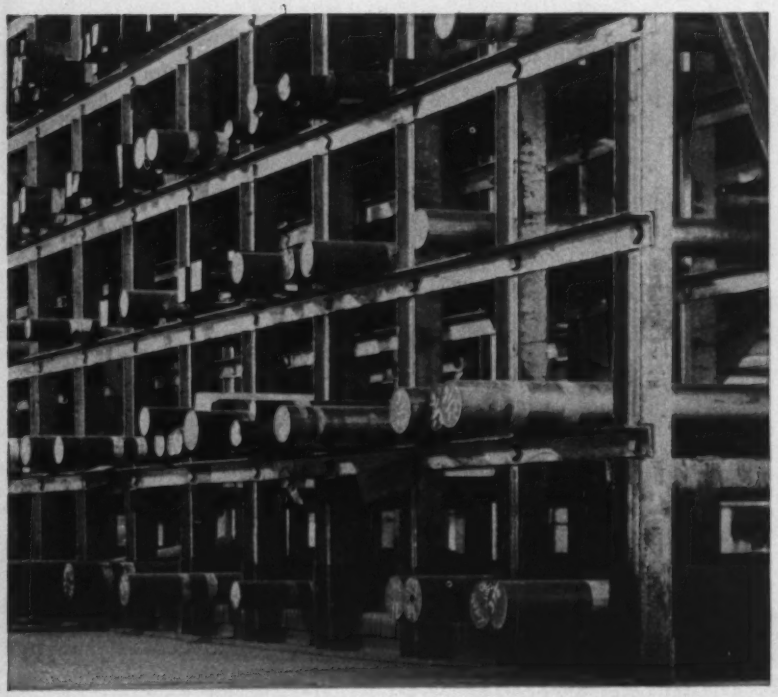
Steels in the high speed group were selected for their superiority in specific applications. They combine high abrasion resistance and red hardness, sacrificing some toughness, machinability, and size stability. They include a tungsten-cobalt-high vanadium steel, two molybdenum-tungsten steels with varying percentages of vanadium, an 8 per cent cobalt steel, and an 18-4-1 tungsten-chromium-vanadium grade.

• The system is flexible.

Additions and changes can be made without requiring revision of the system. And it will not mean the end of the company's present handbook, nor of special analyses.

A change in the system could be made in one of two ways. Addition of a new steel would simply mean

(*Please turn to Page* 122)



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EC&M's engineering team studies every facet of an installation...nothing is taken for granted. Then, and only then, is a control system designed.

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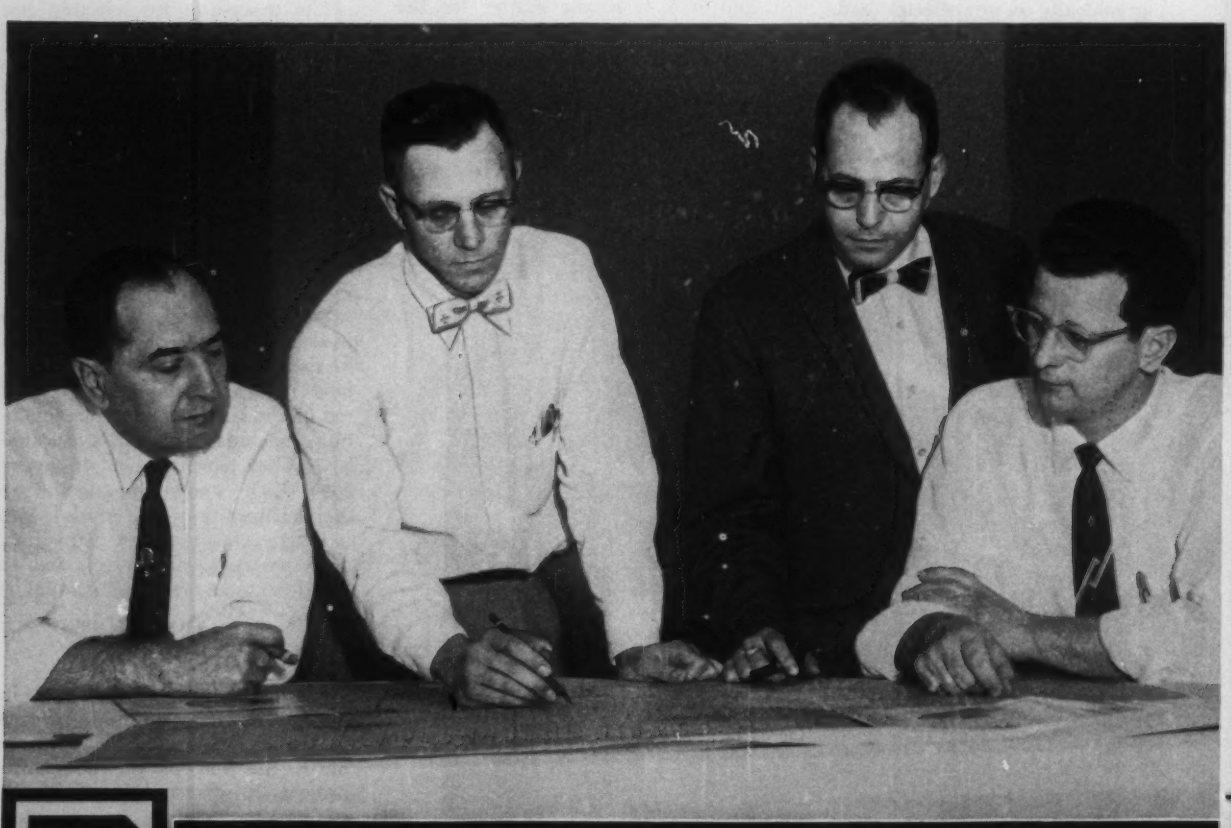

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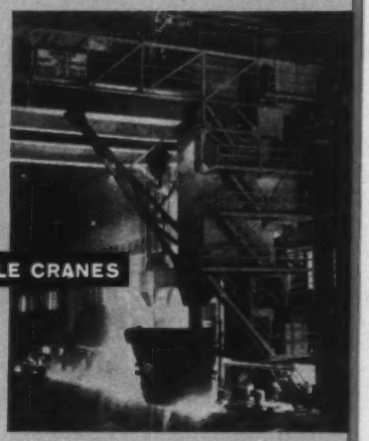
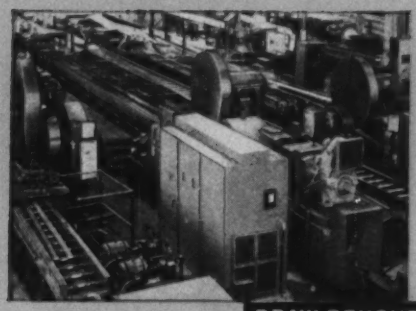


LADLE CRANES

OXYGEN CONVERTERS

ORE UNLOADERS



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- Wire Drawing
- Draw Benches
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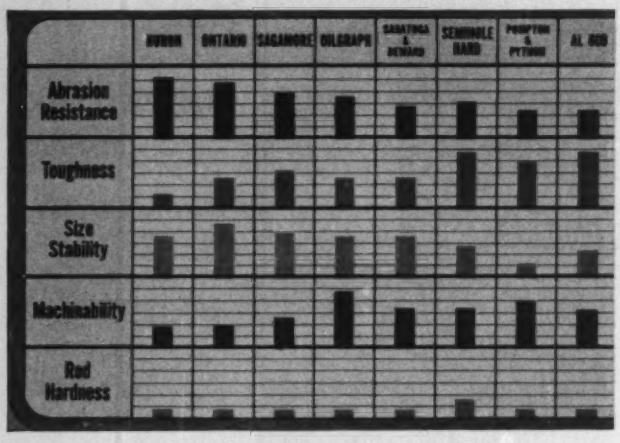
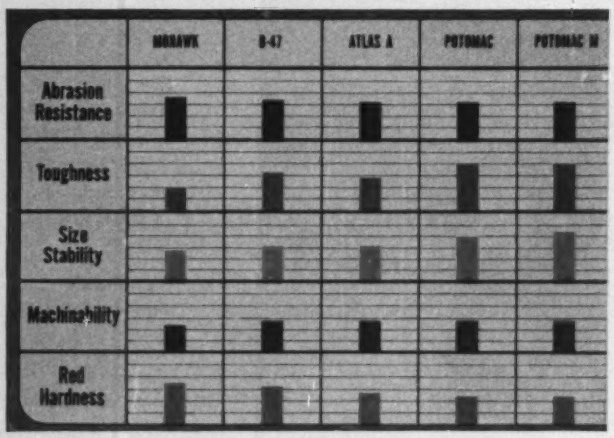
wherever electricity is distributed and controlled

3522

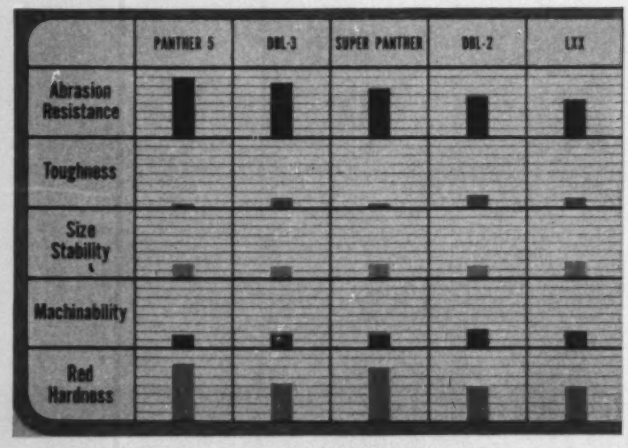
Toolroom Selector



Hot Work Selector



High Speed Selector



(*Concluded from Page 119*)

adding a new series of bar graphs to the appropriate selectors. Replacement with an improved steel would change one column, not affect the others. But such improvements come slowly; changes are infrequent even though the company's research laboratories are continually testing new compositions.

The handbook of tool steels will be revised only to show which steels are the preferred grades. Others will still be listed, but the Steelector grades will be highlighted, and emphasis on comparison of properties will be increased.

Special grades will not be eliminated, says Mr. Fenner. They will be made on a mill order basis, or carried in restricted size ranges for special applications.

• Selector grades are described in detail on the data stock lists and technical data sheets.

Individual data stock lists, included in the program, offer specific information on analysis characteristics, heat treatment, application, and availability. Full data on standard stock sizes are also listed. They also contain information on properties not shown on the bar charts.

The company's "blue sheets," containing detailed technical information on the various grades, will be continued.

• Mr. Fenner feels the program will build user acceptance.

The tool steel industry can produce more than it can sell. A producer can increase his share of the market only if he can give the user a more logical solution to his many problems and better service in handling them.

Mill purchases of Allegheny Ludlum's tool steels have been good over the years, says Mr. Fenner; the Steelector program is expected to increase acceptance of the company's product at the warehouse level.

Have you entered
STEEL's Usership Idea Contest?
Pages 5 and 6.

New rear dump hauls 15% more payload — *built entirely from USS "T-1" Steel.* This Athey PR 619 T-line trailer hauls 25 tons but weighs only 19,260 pounds. One man can move more tons of material, less fuel is consumed when running empty, and the machine has a faster cycle. The big improvement in performance starts with the use of USS "T-1" Steel *throughout.* This "strong boy" of metals cuts dead weight, substitutes 15% extra payload. Tougher, it defies relentless abuse, adds life. USS "T-1" Constructional Alloy Steel has a minimum yield strength of 100,000 psi. It is weldable and has high resistance to impact abrasion and corrosion. What's more, it retains its toughness at temperatures even down to 50 below zero. This combination of properties permits design for maximum weight savings coupled with ability to take abuse. In addition to "T-1" Steel, United States Steel makes other brands of steels for a wide variety of applications: USS COR-TEN, USS MAN-TEN and USS TRI-TEN with a 50,000 psi minimum yield point, in addition to a complete range of carbon and stainless steels.

USS, "T-1", COR-TEN, MAN-TEN and TRI-TEN are registered trademarks

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
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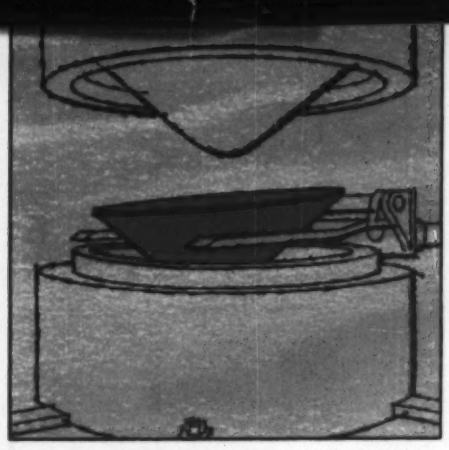
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS



Nose cone being removed from Wyman-Gordon-U.S.A.F. forging press.

Precision Forging of ATLAS Nose Cones

Inspection of copper nose cones at Wyman-Gordon-U.S.A.F. Plant.

When you need a large, custom-engineered die block, think of U. S. Steel first. Take this 40-ton die block shown in the final stage of forging on our 10,000-ton press. Designed by Wyman-Gordon for production of copper nose cones by closed die forging, this job received the personal attention of our metallurgists, forgers, and machinists from start to finish.

To obtain the correct hardness, our metallurgists chose a CrMoV alloy. An 85-ton electric furnace heat was then "vacuum-cast" into a 72" diameter ingot to produce the best internal quality possible. Under the careful supervision of our forge team, the ingot rapidly assumed the final contours. As you can see, the die impression was "forged-in" with a special cupping tool for maximum toughness.

This die block was then subjected to a series of heat treatments and machining operations, closely coordinated between heat-treater and machinist, to produce maximum performance at the Wyman-Gordon-U.S.A.F. Plant. Final inspection of the rough machined block included hardness and ultrasonic testing as well as a close check of dimensions.

In addition to large die blocks such as this one, U. S. Steel makes many types of forgings—all by a team of experts. Let them handle your next order. You'll be assured of a high quality product, specifically engineered for your particular application.

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United States Steel

USS

Here is one of a fleet of forty Type 430 Stainless Steel tank cars that transport nitric acid. Built in 1956 by General American Transportation Corporation, these tank cars are still in excellent condition.

Leading the pure life—in USS Stainless Steel

A manufacturer's *second* biggest disappointment is to have his product rejected because it was contaminated during shipment. The *biggest* disappointment comes when the customer buys his next order from someone else.

Manufacturers who ship or contain their products in Stainless Steel seldom worry about product purity. Many chemicals that eat away other metals have no effect on Stainless Steel. It keeps a smooth, dense surface that is easy to clean. No corrosion. No pits. No place for dirt to hide. And there's less danger of spoiling one batch with residue from another.

Because Stainless Steel is so strong, it can be used in thinner, lighter gages—reducing the overall weight of the container. But the real clincher is this: even though Stainless Steel costs more, there is no cheaper material in the long run. Specify USS Stainless Steel . . . through our nearest sales office or your local Steel Service Center.

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American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

WaiMet, Armco Increase Ductility of 17-4 PH

Minimum elongation values of Armco 17-4 PH have been doubled by modifications in chemistry and higher aging temperatures, says WaiMet Alloys Co., Dearborn, Mich., which worked closely with Armco Steel Corp., Middletown, Ohio, on the project. (The material was erroneously identified in STEEL, Apr. 11, p. 102.) Tests on ten recent heats indicate values are now between 11 and 16 per cent.

The development is said to make the stainless alloy much more useful in investment casting applications. Modified composition gives investment casters a more stable combination of mechanical properties, a feature long sought by airframe and production engineers.

Both WaiMet and Armco Steel are trying to gain a revision in the AMS 5355 specifications and have submitted their proposal to the Aero-Space Materials Division, Society of Automotive Engineers.

You can obtain a detailed copy of test results by writing to WaiMet Alloys, 5320 Oakman Blvd., Dearborn 2, Mich.

Finishing Line Boosts Conduit Tubing Capacity

A recently installed conduit finishing line has boosted production more than 80 per cent at Youngstown Sheet & Tube Co., Youngstown.

The line, designed and manufactured by Hanson-Van Winkle-Munning Co., Matawan, N. J., is 325 ft long. The installation has a maximum production capacity of more than 1200 ten-ft units of ½ in. Electro Metallic Tubing per hour.

The equipment consists of a series of cleaning, pickling, and electrogalvanizing tanks arranged in a straight line. Traveling at a rate of 7 ft a minute, the conduit takes 45 minutes to go through the process. The conduit emerges from the machine with a lustrous galvanized finish instead of the dull finish previously produced.

Power to operate the unit comes from nine remotely controlled germanium rectifiers ranging from 5000 amperes at 12 volts to 10,000 amperes at 9 volts.

Double Carbide Saw Steel Reduces Bar Cutoff Time

Saw bands made of a new alloy have the hot hardness and abrasion resistance needed for increased blade speeds and faster feeds on standard equipment

DEVELOPMENT of a new alloy steel for bandsaw blades may help metal fabricators hold down cutoff costs.

Blades made of a double carbide material (developed by a leading alloy steel producer for Capewell Mfg. Co., Hartford, Conn.) are said to saw three times as fast as blades previously used on standard band machines.

• Alloy specifications included those characteristics most important in saw bands.

After several years of research and development, engineers perfected an alloy steel for one use: The manufacture of bandsaw blades.

The alloy has the hot hardness and abrasion resistance necessary at higher speeds and faster feeds on standard cutoff machines. Those features increase the range of materials that can be cut with standard equipment; they also extend blade life and reduce downtime for blade changes.

The blades permit metal fabricators to get higher performance out of standard saw machines, often eliminating the need for expensive special saws. They can also be used, in many cases, on machines designed for high speed bands.

• Claims of high performance are reinforced by field reports.

Information from users indicates outstanding performance on several materials, says Capewell.

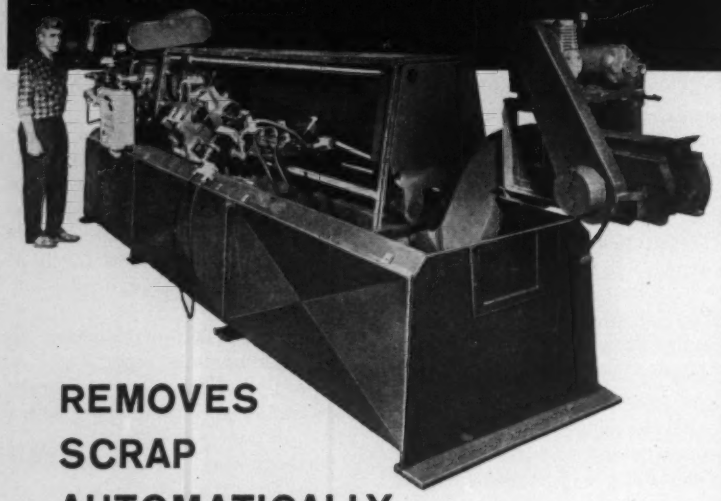
In tests conducted at the company's laboratory, a blade made of the double carbide material cut a 5½ by 9½ in. steel slab in 90 minutes. The same cut, with a conventional blade, took 9 hours.

Here's How the Blades Performed In Typical Cutoff Tests:

Material	Thickness (inches)	Width (inches)	Cutting Time (minutes)
AISI Type H-13 Steel	5½	9½	90
	6	8½	125
AISI Type H-12 Mold Steel	3	8	150
	2¼	8	70
	2¼	11	90
Leaded Steel, 30 Rc	5	6	30
	1¾	12	15
	1¾	30	38
Steel Prehardened to 30 Rc	4	16	70

MAY-FRAN CHIP-TOTE

PROVIDES ADDED VERSATILITY FOR HILL DRILL



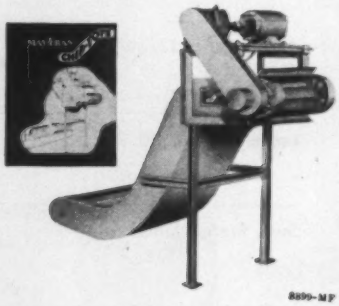
REMOVES SCRAP AUTOMATICALLY AND CONTINUOUSLY!

When continuous high-speed metal working operations mean the difference of profit or loss . . . the May-Fran CHIP-TOTE stands ready to remove scrap efficiently and automatically.

In the photograph above, the HILL-DRILL (a product of Walter P. Hill Inc.) is shown equipped with a May-Fran CHIP-TOTE. This accessory unit was fabricated into the machine prior to delivery to customer. Every day, more and more machine tool manufacturers are specifying the CHIP-TOTE to provide their automatic machines with virtually unlimited production without need for shutdown for scrap removal.

CHIP-TOTE scrap handling units are available for attachment to almost every kind and type of machine tool in use today. They are assembled from mass-produced component parts to meet a wide range of varying specifications.

If you have a scrap handling problem involving wet or dry chips turning or borings, write today for your copy of MF-640 which describes the CHIP-TOTE in detail.



MAY-FRAN ENGINEERING, INC.

1725 Clarkstone Rd. • Cleveland, Ohio

8890-MF

Convair's Dynapak Tests Missile Parts

BY merely pressing a button, structural engineers can simulate the impact of a missile nose cone or other solid body plunging into the ocean at supersonic speeds. The splash can be repeated with precision any number of times in tests on experimental components.

Several water entry test facilities are in operation or under construction. Each is designed for a specific test, but all are based on the Hyge principle, developed by Convair Div., General Dynamics Corp. The machines were produced at its Dynapak facility, Pomona, Calif.

• The test units operate on the principle that G forces are the same whether they are produced by acceleration, deceleration, or centrifugal force.

When a body hits the water, it decelerates rapidly; that creates high G forces in the structure. The water entry simulator produces G forces by rapid, controlled acceleration. It creates a shock load that simulates the splash.

It is simpler to pour energy into an object, under control, than to remove energy from a moving object, Convair's engineers say. Because the test takes place during acceleration, the deceleration can be prolonged, reducing forces on the test equipment to a workable level.

• Rapid acceleration is produced by a piston-cylinder arrangement.

Compressed air is used to move the piston, but it must enter the cylinder through a relatively small orifice. In the start position, the piston is resting against the orifice opening, sealing it. The compressed air can act only against the small exposed area in the center of the piston. That force is easily balanced by a reservoir of moderate pressure air acting on the other side.

If the first pressure is steadily increased, a point will be reached where forces on the piston cause it to move slightly away from the orifice. Then the compressed air can act across the entire piston face, providing a force many times the one opposing it.

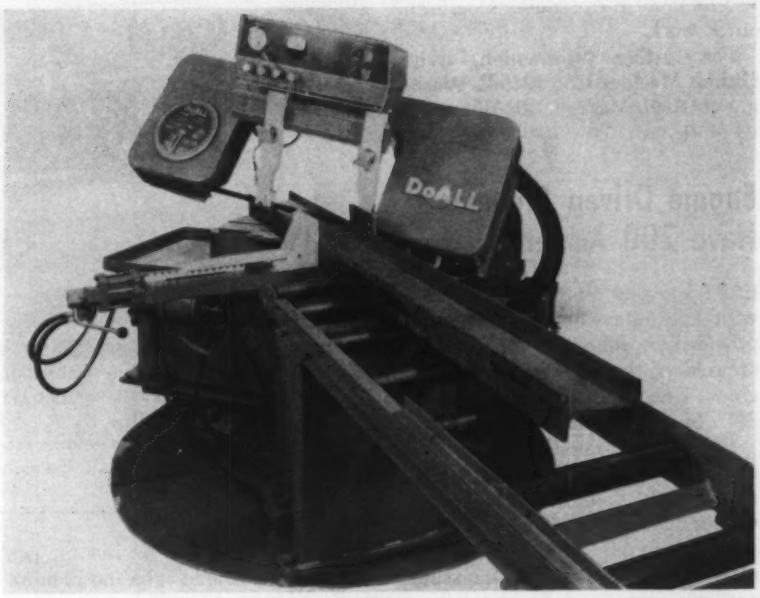
Angle Power Saws Have Rotating Cutting Heads

THIS angle cutting saw (DoAll Model C-167A) does accurate, high speed mitering and cutoff work ranging from stacks of small tool blanks to 12 in. I-beams. A companion model, the C-168A, has an automatic stock indexing table.

A heavy turntable permits the cutting portion of the machine to be rotated from 90 to 45 degrees. A scale (graduated in degrees) permits the operator to set the angle. A manual lock on the turntable secures the cutting head.

Each unit has a holding vise mounted on a stationary support. A 1 in. wide steel saw band is used. The saw produces a clean, burrfree surface that is flat within ±0.002 in. per inch of cut.

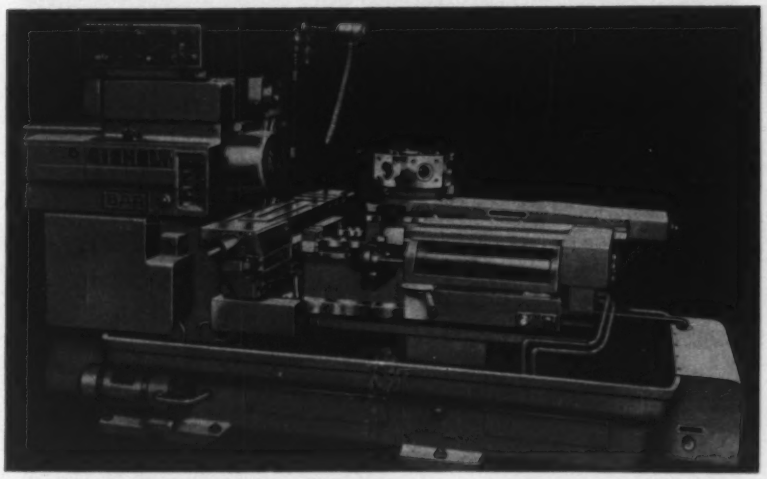
For further information, *write* DoAll Co., 256 N. Laurel Ave., Des Plaines, Ill.



Automatic Ram Turret Lathe Comes in Two Models

HERE is an automatic lathe for bar and chucking work. Two versions are available: Model 4AR with a 2 in. bar stock capacity and Model 5AR with a bar stock capacity of 2½ or 4½ in.

Except for infinite feed selection (within a range of ¼ to 120 in. per minute) for the hexagon turret ram and the cross slide, machine capacity and operation are similar to the standard manually operated ram type turret lathe. The manufacturer says the turret lathe combines automatic cycle efficiency with the versatility and quick setup of hand operated, ram type lathes. Estimated learning time for cycle programing: One day for an experienced lathe operator. The rest of the setup is the same as for the standard ram type turret lathe.



You can include the operation of a turret mounted Jetracer slide tool in the automatic cycle. Standards tools are used and all setup is made from the front of the machine. Changeover from bar to chucking work takes less than an hour. Cross slide operation is independent of the hex turret. The side carriage can be positioned longitudinally to suit the

work. You can program the cross slide to operate while the turret is waiting at full back position. It can operate simultaneously with the turret or after the turret comes forward. It can also operate while two or more turret stations perform other work.

For further information, *write* Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.

Engine Driven Arcwelders Have 200 Ampere Rating

EASY starting and good stability with adequate welding voltage are provided by four new Sureweld dc arcwelders, powered by gasoline engines. The series (designated SGW-201) has weatherproof construction.

Electric or manual starting is available. Welding output is 200 amperes, 30 volts dc. Auxiliary ac output of 120 or 240 volts can be used when not welding for lights, electric tools, and motors. The units can be connected in parallel to produce increased dc welding current.

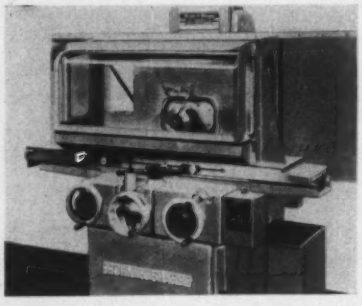
Standard equipment includes two, positive contact, welding cable plugs with insulating sleeves; a duplex receptacle for ac auxiliary power output; a tubular carrying frame with handles; a lifting eye covered by a hinged access door; dual mufflers, and a starting rope and sheave.

For further information, *write* National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Machine Slices, Dices Semiconductor Materials

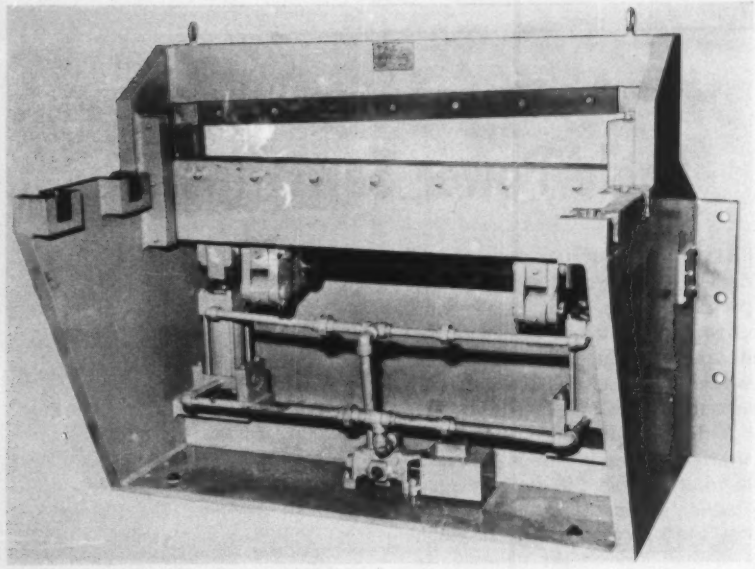
SEMICONDUCTOR materials (such as germanium, silicon, and quartz crystals) can be automatically sliced and diced on the 618 Micromaster with parallel accuracy to 0.0001 in. with consistent repeats in size to ±0.002 in. The unit uses a metal bonded or resinoid bonded diamond wheel to produce clean, burnfree wafers.

The table driving mechanism provides smooth feed, infinitely adjustable from 0.100 to 144 in. per minute with rapid table positioning adjustable to about 25 ft per minute. The cross feed is actuated automatically at the beginning of each cycle by a hydraulic mechanical arrangement, accurate to ±0.0002 in. and adjustable from 0 to 0.1000 in. Total amount of index is read directly from the handwheel graduated in increments of 0.00025 in. Adjustment is independent of the handwheel to facilitate setup.



By adding a wheel sleeve and adding wheels, wafers can be diced in quantity with one pass of the table.

For further information, *write* Machine Tool Div., Brown & Sharpe Mfg. Co., 250 Promenade St., Providence 1, R. I.



HYDRAULIC SHEAR CUTS FISHTAILS from leading and trailing ends of strip and sheets. It bolts directly to the mill housings. The sheet or strip passes from mill rolls between the knife blades. The unit operates from the mill's hydraulic system and is controlled by the roller from his panel. Models are available for cutting strip and sheets in widths from 24 to 84 in. For further information, **write** Curry Air Shear Corp., 1 Gateway Center, Pittsburgh 22, Pa.

Resin Protects Windings From Contamination

A RESIN called Everseal is being used by U. S. Electrical Motors Inc. to encapsulate windings of motors subject to excessive moisture, acids, gases, alkalies, abrasives, dusts, and other contaminants.

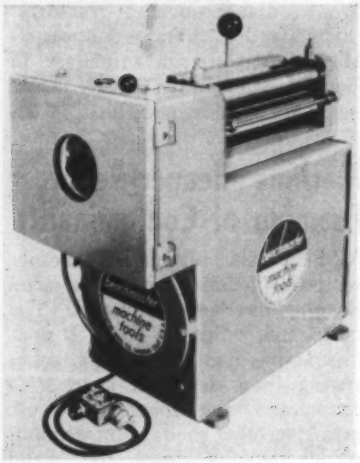
The stator is enclosed in a mold and liquid epoxy resin is injected under vacuum. Each winding is permanently and individually sealed. Open motors with such insulation have a service factor of 1.15.

For further information, *write* U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.

Feeder Is Automatic, Handles 12 in. Widths

WITH the MAF machine, uniform, predetermined lengths of material can be fed automatically to any secondary machine. It consists of a friction type, roll feed mechanism driven by a constantly running flywheel driven by an electric motor. An adjustable, length measuring control can be preset to continuously

NEW PRODUCTS and equipment



and automatically produce any work length within the machine's range (3 to 60 in.).

Micrometer control permits work length adjustments to 1/32 in. or less. Standard feed speed is 50 sfpm. Other feed length ranges and speeds can be supplied on special order. You can get units to handle stock up to 12 in. wide and 1/8 in. thick. They can be used to feed flat material, coiled stock, or round stock with specially contoured rolls.

For further information, *write* Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif.

Grinding Attachment Uses Belts 4 in. Wide

AN ABRASIVE belt grinding attachment for heavy duty lathes, mills, planers, or other machine tools has been developed by Production Machine Co. The attachment can be used for heavy stock removal, close tolerance size control, and low microinch finishing.

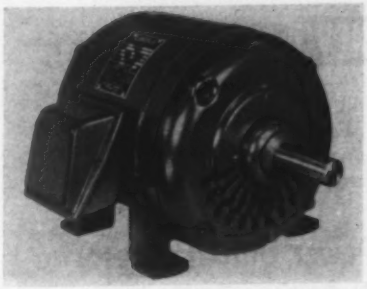
The standard model can be furnished with a righthand or lefthand assembly and uses a contact wheel 12 in. in diameter and abrasive belts up to 4 in. wide and 86 in. long. Belt tension is maintained by an air or hydraulic cylinder. The unit may be installed in horizontal, vertical, or angular positions.

For further information, *write* Production Machine Co., Wells Street, Greenfield, Mass.

Motor Is Protected By Acid Resistant Paint

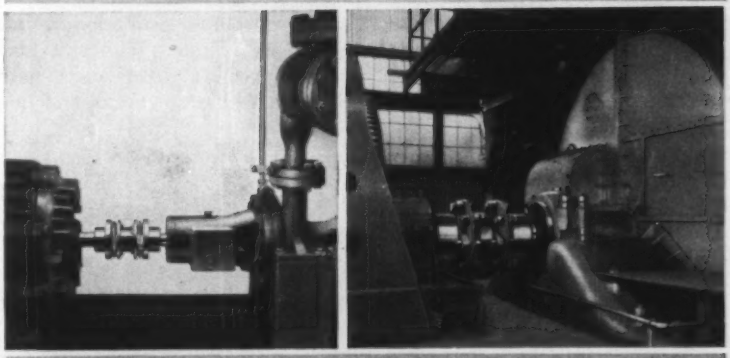
RATINGS from 1/2 to 125 hp are included in Lincoln Electric's line of three phase, squirrel cage induction motors. A special thermosetting plastic is used to encapsulate and impregnate the stator.

The diecast aluminum rotor is supported by doubly shielded Super Conrad type bearings. The motor may be operated with the shaft in the vertical or horizontal position. A sealed housing having a grease reservoir and facilities for greasing increases bearing life.



The entire motor is coated (inside and out) with a vinyl base primer

Protect your PUMPS and other Indispensable MACHINERY with THOMAS FLEXIBLE COUPLINGS



NO LUBRICATION NO MAINTENANCE NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES:

- Freedom from Backlash
- Torsional Rigidity
- Free End Float
- Smooth Continuous Drive with Constant Rotational Velocity
- Visual Inspection While in Operation
- Original Balance for Life
- No Lubrication
- No Wearing Parts
- No Maintenance

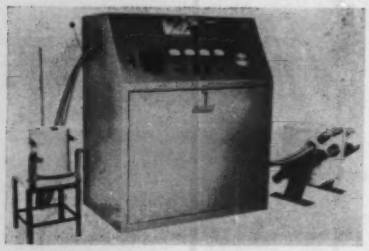
THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

and an acid resistant paint.

For further information, *write* Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

Power Unit Handles Two Induction Furnaces

A SELF-CONTAINED, 50 kw, motor-generator and control unit for induction melting (high frequency) has been developed by Inductotherm Corp. It contains the entire power supply, capacitors, and the control and safety devices necessary to operate one or two high frequency induction furnaces or coils.

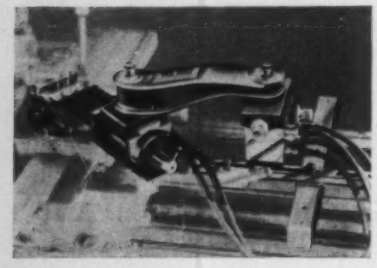


An eight step auto transformer and a 32 position capacitor switch are used. The installation requires a 60 cycle, 440 or 220 volt power connection, a cold water connection, and a water drain.

For further information, *write* Inductotherm Corp., 412 Illinois Ave., Delanco, N. J.

Lathe Tracing Attachments Used for Part Duplication

NO MACHINE conversion is necessary with the Model Mark II lathe tracing attachment. The unit can be attached or removed in minutes. It's a pivot type design and is suitable for shaft and facing duplication.



The system is hydraulically operated.

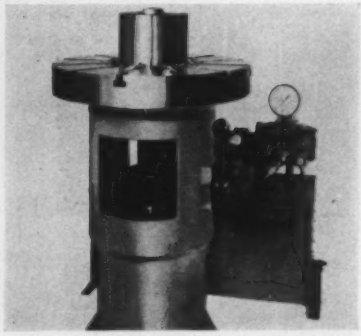
The manufacturer also has another tracing attachment for turning applications. The unit (called Synchro/Traceturn) will duplicate 90 degree shoulders and operates at a uniform feed rate regardless of the shape of the pattern or master being duplicated.

For further information, *write* True-Trace Corp., 9830 Rush St., El Monte, Calif.

Hydraulic Expanding Unit Has 30 in. Table Diameter

THE HYDRAULIC expanding machine designated E-62 by Greenerd has a maximum ram pull of 62 tons. Table diameter is 30 in. It's equipped with 12 segment master jaws 6 in. high. Minimum jaw diameter is 7.572 in., true diameter is 9 in., and maximum diameter is 9.158 in.

The machine can produce six cycles per minute. The unit may be equipped (at extra cost) with electric pushbutton control and ram



time lag. You can get it furnished for stretch forming metal cold, or water cooled for high temperature work.

For further information, *write* Greenerd Arbor Press Co., Nashua, N. H.

Portable Unit Measures Thickness Ultrasonically

THE THICKNESS of steel, brass, nickel, copper, aluminum, and other transmitters of ultrasonic sound can be directly read on the Sonizon SO-200. It's a portable, transistorized, battery powered unit.

Placing a probe on the surface of the piece to be measured and rotating a dial is all that has to be done to obtain thickness readings.

For further information, *write* Magnaflux Corp., a subsidiary of General Mills Inc., 7300 W. Lawrence Ave., Chicago 31, Ill.

Machine Cleaner Reduces Foaming of Contaminants

A SPRAY washing machine cleaner with low foaming action in metal cleaning has been developed. The compound, called Lo-Foam, is noncaustic, has high emulsifying, penetrating, and detergent action. It counteracts the foaming of oil, grease, or other similar contaminants being removed from the metal parts.

For further information, *write* Frederick Gumm Chemical Co. Inc., 538 Forest St., Kearny, N. J.

Heavy Duty Lift Truck Has Power Steering

DESIGNED for steel mill or other heavy duty operations, the Elbolift industrial truck is gas operated, electric driven, and can stack such things as steel coils 120 in. high.

Handling is made easy with power assisted steering. One lever operates forward and reverse speeds plus lift and tilt control. The truck comes with a foot operated inching control and hydraulic type wheel brakes.

The Elbolift is built in ratings from 15,000 to 20,000 lb. A battery

powered version is available in capacities from 12,000 to 25,000 lb. Optional equipment includes a split ram, fork attachment with a side shifter for accurate positioning of loads.

For further information, *write* Automatic Transportation Co., 149 W. 87th St., Chicago, Ill.

NEW literature

Write directly to the company for a copy

Metal Powder Directory

A 22 page directory includes technical data on metal powders produced by 29 companies. It covers ferrous and nonferrous, granular metal powders, and graphite powders. Metal Powder Industries Federation, 60 E. 42nd St., New York 17, N. Y.

Molybdenum Mill Products

A 22 page specifications booklet on molybdenum mill products covers unalloyed molybdenum and Mo-0.5 Ti alloy billets, bars, plates, and sheets. Data are included on scope, manufacture, chemical composition, structure, mechanical properties, dimensions, finish, and inspection. Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa.

Push-Type Broaches

A 4 page brochure describes various standard, off-the-shelf push-type broaches: Round, square, hexagon, and serration portable. California Broach Co., 666 S. Anderson St., Los Angeles, Calif.

Hollow Bar Stock Sizes

An 8 page brochure lists the range of sizes for hollow aluminum bar stock and gives complete tables for standard sizes in round and hexagonal rods and bars, the wall thicknesses, dimensions, and weight per foot. Harvey Aluminum, Torrance, Calif.

Belt Conveyor Idlers

A 48 page booklet, No. 171, on belt conveyor idlers gives details of construction, selection, procedure and examples, engineering tables, dimensions, and specifications. The basic types of idlers used in all types of service are described. Hewitt-Robins Inc., Stamford, Conn.

Heat Resistant Castings

A comprehensive analysis of the factors involved in selecting high alloy heat resistant castings for applications where temperatures exceed 1200° F is presented in a reprint. Alloy Casting Institute, 1001 Franklin Ave., Garden City, N. Y.

NEW BOOKS

Extractive Metallurgy, Joseph Newton, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y., 532 pages, $9.75

The discussion includes minerals, types of ores and mining, and continues with methods used in processing mine products for metal recovery. Principles relating to extractive reactions and combustions are reviewed, and one chapter covers structure of alloys and of metals in general. A review of the principles governing phase diagrams is included. A section on fuels and refractories, basic to an understanding of the principles of pyrometallurgy, precedes the chapter on that important method for recovery of metals. That is followed by chapters on hydrometallurgy, electrometallurgy, and a section on ingots.

Quality Requirements of Super-Duty Steels, edited by R. W. Lindsay, Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y., 309 pages, $8.50

The third in a series of Metallurgical Society Conferences sponsored by the AIME, this volume is based on a conference held at Pittsburgh. The papers and discussions include authors from steel producers and consumer companies. The presentation includes a discussion of environments and requirements, relationship of composition, structure, and properties, and manufacturing procedures. Conventional furnace practice and various vacuum methods are discussed. Aircraft and nuclear applications, because of their stringent requirements, are treated separately.

Reactive Metals, edited by W. R. Clough, Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y., 610 pages, $15

Volume 2 in the series of Metallurgical Conferences of the AIME, this book contains the papers presented at the Third Reactive Metals Conference sponsored by the Niagara Frontier Section of the AIME, Buffalo. It comprises 37 papers on 11 reactive metals and discusses properties, applications, forming methods, and metallurgical characteristics.

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Stability Returning to Market

STEEL ORDER BOOKS are firming as users complete their inventory adjustments and resume buying on a scale that's geared to consumption.

Steelmakers saw the first signs of a turnabout last week, when the 45 day leadtime for June shipments expired. Consumers sent in a lot of last minute orders, indicating that they have returned to the normal purchasing routine. Many companies that won't take tonnage in May are ordering steel for June delivery—not in huge quantities but in amounts that will more than offset June cancellations and setbacks.

SERVICE CENTERS STEADY— Often among the first to notice changes in the rate of metal consumption, steel service centers report that their business has leveled off at about 65 per cent of the peak November-January rate. Sales dipped sharply in mid-February as customers finished rebuilding their strike depleted stocks. Then business stabilized. March and April orders have been on a par, 5 to 10 per cent better than 1959 figures.

BACKLOGS SHRINKING— In spite of the market's firmer tone, steelmakers aren't booking as much tonnage as they're shipping. Many products are in light demand and won't have an upturn until June or July. The best that can be said for wire, plates, standard structurals, stainless steel, and oil country goods is that sales are no longer declining. No big gains can be expected until surplus stocks are consumed. Needed: Better weather, more construction, bigger spending for capital equipment, an automotive sales boom.

SHIPMENTS STAY HIGH— Because of variations in product mix, some steelmakers are operating at less than half of capacity while others are running full blast. Among the hardest hit companies are producers of wire, stainless steel, and oil country pipe. Firms that make flat rolled products still have backlogs. Some will ship at capacity this month and next, despite a drop in orders.

STOCKS STILL RISING— Even though users have been trimming their steel stocks, total consumer inventories are increasing—but at a slower rate than in the first quarter. In the first three months, domestic shipments and imports exceeded consumption by about 4.5 million tons. Consumer inventories jumped from 13.5 million tons to 18 million. Even if shipments dropped to 7 million tons this month (vs. 8 million in March), they would exceed consumption by about 300,000 lb.

USERS TIGHTEN BELTS— At 18 million tons, consumer inventories are less than normal for a period of high consumption. Three times in the last four years—twice on the eve of strikes—they've gone as high as 26 million. This time, market analysts believe users will avoid overbuilding. Reason: At 81 per cent of capacity, steelmaking operations closely approximate consumption.

If there's any weakening of the economic outlook, particularly in new car sales, users may start liquidating their stocks again. They learned during the first quarter that the mills have plenty of capacity and that inventories of 14 million tons are big enough to support high consumption. If they decided to liquidate 1 million tons a month in May, June, July, and August, steelmaking operations could drop as low as 65 per cent of capacity. Then, with only a moderate upturn in the economy, production might rebound to an average rate of 85 or 90 per cent in the fourth quarter.

INGOT RATE CLIMBS— Recovering from Easter holiday production cutbacks and a wildcat strike in Detroit, steelmaking operations advanced 2.8 points last week to 80.9 per cent of capacity. Output was about 2,305,000 ingot tons.

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*Current prices were published in the Apr. 18 issue and will appear in subsequent issues.

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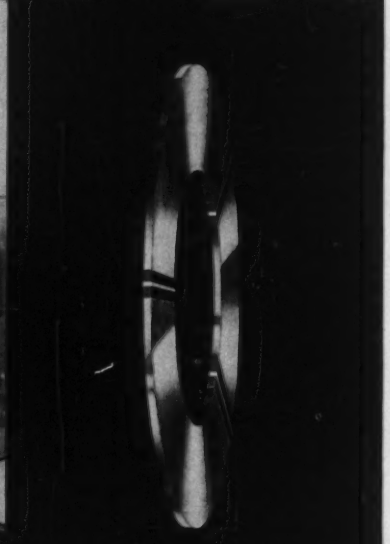
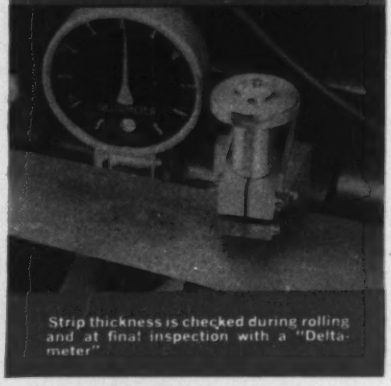
Smoothness of strip surface is checked with a "Talysurf" surface measuring instrument which registers the profile depth magnified up to 50,000 times.

Checking the flatness of hardened strip steel.



Sandvik laboratories carry out over 200,000 chemical analyses a year.



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Sandvik spends extra time, money and effort to produce spring steels with the quality to meet difficult performance demands.

From the ore in Sandvik's mines to the finished strip, Sandvik applies constant, rigid quality control to every steel-making step. Special analyses, careful, small-lot processing, modern laboratories equipped with special scientific instruments . . . these are behind Sandvik's record of success in tough spring steel applications.

For special physical properties plus accurate and uniform flatness, straightness, width, gauge and edge finish, specify Sandvik. Wide variety of qualities and sizes in stock plus local Sandvik facilities for custom-processing and finishing to your requirements. Send for free brochure.

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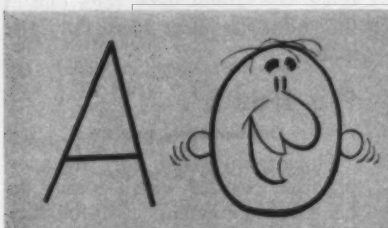
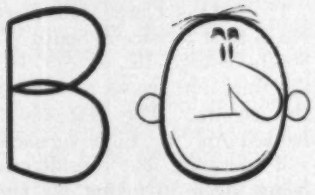
***Works:* Sandviken, Sweden**

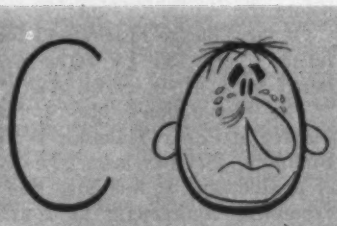
ABCs of Gray Iron Foundrymen



The 1955-56 smile: Business booming, with both commercial and captive shops running full schedules; captives jobbing out their patterns.



This is where the industry stands today: Business is moderate. Not as good as "A" but better than "C." Captives are calling in some of their patterns, but commercial shops are still working 40 hour week.



The 1958 blues: Captives calling in all their patterns and beating the bushes for commercial business. Jobbers running on short workweek with reduced labor forces.

"BUSINESS is the best we've had in about two years."
"BUSINESS is so poor that unless we get some orders in the next two weeks we'll be flat on our backs."

Those clashing opinions were stated last week by two gray iron foundrymen whose shops are practically in the same block. If there were a third founder in the neighborhood, he might well have said: "It's not good, not bad."

The three positions run the gamut of conditions in the industry, but most shops look for condition B ("not good, not bad") to prevail throughout most of 1960.

• **That's Not Bad**—Donald H. Workman, executive vice president of the Gray Iron Founders' Society Inc., who coined the ABCs of gray iron foundrymen (above), feels that even though this year won't be as good as anticipated, it still will be a pretty good one. "At the turn of the year," he admits, "I forecast a 10 per cent increase over 1959, which was really not a bad year. Right now, I'd have to say that we'll do well to post a 5 per cent gain." Last year, the industry's shipments totaled 12.3 million tons. That would make this nearly a 13-million-ton year, or the best since 1956.

"But," Mr. Workman cautions, "don't try to generalize about all gray iron foundries from that statement. Just a few days ago, I was in a district meeting with some of the men, and there just wasn't much agreement about business."

• **Sudden Slowdown**—The way the year started out, it looked as though the 10 per cent forecast was a sure bet. Department of Commerce figures showed January was ahead of the year ago pace by nearly 12 per cent. Private estimates for February and March were nearly as good. It wasn't until April that orders started to fall off for quite a few jobbers, and now it looks like industry shipments for the month might fall well behind the year ago rate.

One small Ohio jobber started the year with about a two month backlog. Today, he has about two to three weeks. An official of a production shop declares: "I think most foundrymen will be surprised if 1960 turns out better than 1959. Sales have been hampered by the general conservative attitude about inventories and the feeling among our customers that sales aren't up to expectations. Builders of heavy machinery, our major customers, seem to be biding their time. Unless they get going pretty soon, I'd say there isn't much chance for plant and equipment expendi-

tures to come up to the government's forecast of $37 billion for this year."

• **Counterpoint**—But listen to John Davenport, president of Cleveland's Fulton Foundry & Machine Co. Inc.: "While our green sand stuff has been going great guns, our heavy castings have kept us moving. There has been a dip in orders in the last two weeks, but I don't think it is going to last. We are going to add to our payroll within the next month."

And Fred S. Green, assistant general manager of the Elyria Foundry Div. of Chromalloy Corp. in Elyria, Ohio, declares: "We're operating on a 40 hour week and don't see any cutbacks in the near future. We have seen some increase in machine tool activity recently, although I think this is not typical of the industry. Our inquiries are terrific—more than in quite some time."

• **Imports Hurt**—Most foundrymen agree on one thing: If it weren't for the rapid increase in imports of such finished items as autos and machine tools, they would be far busier than they are. Direct competition for castings has not been a big factor—although some fittings have been coming in from Japan. But the opening of the St. Lawrence Seaway is causing some concern in the Great Lakes area. Says one producer of high strength castings: "About three years ago, a Toledo (Ohio) firm asked for bids on a set of rolls for a machine it had bought in Belgium. The rolls required a fair amount of machining. I lost the bid to a European firm which shipped the finished rolls by way of Canada for less than I could make the raw castings. The bids are up again this year, but with cheaper shipping by way of the Seaway, I know I don't stand a chance."

And with an anticipated increase in prices this year (about 3 to 5 per cent, say most officials), the situation is not likely to get any better. But as one official claims: "I have to meet the steel industry's package this year or face a strike."

• **Clinics Help** — Customer clinics sponsored by the Gray Iron Founders' Society the last couple of years have helped overcome the barriers of price and foreign competition. Designed to acquaint engineers, designers, purchasing agents, and executives with the expanding potential of gray iron casting applications, the clinics have been one of the industries most successful sales tools.

Pig Iron . . .

Pig Iron Prices, Page 154

Sluggish demand for merchant pig iron, coupled with a steady decline in requirements at steelmaking centers, is forcing a reduction in blast furnace operations.

U. S. Steel Corp. shut down its No. 5 blast furnace at South Works, South Chicago, Ill., on Apr. 16. It's the third furnace to be idled there this month. The first two were banked Apr. 1. Eight furnaces are still operating, but consideration is being given to taking off another before the end of this month.

Of the Chicago district's 43 blast furnaces, only 35 are active compared with 41 in early March.

The corporation's No. 4 blast furnace at Edgar Thomson Works, Braddock, Pa., has been taken out of production. It was idled due to decreased requirements for iron in the Monongahela River Valley, officials explained. National Tube Div. idled one stack at its Lorain Works, Lorain, Ohio.

Some steel mills in the Buffalo district may reduce blast furnace operations soon. One mill in that district has instructed dealers to halt shipments of short shoveling turnings used in blast furnace melts.

The first shipment of merchant iron up the Great Lakes this season is being loaded at Buffalo.

Further downward adjustments have been posted on pig iron freight rates from Beacon, N. Y., to most consuming points in New England. The action narrows the spread in equalization with Troy, N. Y., the producing point which will be the base for shipments to northeastern points.

Iron produced at Buffalo is customarily stored at Beacon for transshipment to New England, and with the closing of the Mystic furnace at Everett, Mass., the tonnage will likely be larger. By June 1, stocks of Mystic iron will be well depleted.

New England foundries are operating at an average rate of 70 to 75 per cent of capacity.

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Foreign Steel Sales Slow in Southwest

Buying of foreign steel is depressed in the Southwest. Importers who overbought late in 1959 are following a cautious course. But consumers who have been anticipating sharp price cuts by overseas mills have been disappointed.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 148 & 149

Sheet orders on mill books are considered firm; most of the water was squeezed out of them in recent weeks by cancellations and cutbacks. Expectations are that the washing out of tonnage on order is about over, so that the mills can count on the tonnage still on their books to support finishing operations at a fairly high level through June.

Not much in the way of new buying is expected before July, however. That's because manufacturers have trimmed their production schedules from original projections. Also, they are not depending on inventories to the same extent as they have in the past. Assured of prompt mill deliveries in most categories of sheets, they no longer find it necessary to protect their supply requirements far ahead.

Most sheet sellers are not optimistic about new business the rest of this quarter. But they view the outlook for the third quarter with a lot more confidence than was recently in evidence. There's a feeling in steel circles that July should see the mills getting back into a stronger order backlog position. By that time, it's figured, the autobuilders will be ordering steel for their 1961 model runs. Right now they are said to have enough steel in stock and on order to complete their 1960 runs.

Galvanized sheets lead all other steel products in demand, followed closely by cold rolled sheets.

Deferments, rather than outright cancellations, mark slackening activity in the carbon sheet and strip market in New England. Most of the tonnage will be shipped by the end of the current quarter, though not until June in some cases. Galvanized demand is running counter to the general trend, notably on the heavy gages for highway drainage structures.

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sumers hold substantial inventories. This is causing converters to review orders on mill books.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 148

A pickup in construction steel needs, notably reinforcing steel, mesh, highway specialties, light shapes, and wire rope is expected with improved weather conditions.

Heavy construction is bolstering demand for bars at some points. But competition is stiff, and prices are under pressure. Imports are contributing to the easiness in the market. This was reflected in the Pacific Northwest recently when makers of reinforcing bars lowered their prices by revising quantity extras. The action was taken to meet the low prices quoted on foreign bars.

The new quantity extras on reinforcing bars and light structurals in the Pacific Northwest lower consumer steel costs $10 a ton on quantities of 5 to 10 tons, $16 a ton on 10 to 20 tons, and $15 a ton on quantities over 20 tons.

Fabricator-distributors hold substantial stocks of bars, and mill shipments are again on a normal basis, including leadtime. Orders in hand, in some cases, will be filled by imported bars. At some points, mill backlogs are reported off from a month ago, but with much new public business in sight (schools, highways), it's thought the mills will be kept busy over the next several months.

Steel Bars . . .

Bar Prices, Page 147

Stretchouts, cutbacks, and cancellations have sharply reduced bar mill order backlogs during recent weeks. Indications are that most of the adjustments are over—that's the opinion of many mill sales executives, though new orders continue to lag.

April production is expected to be at 80 to 85 per cent of capacity. May output will probably be at a rate 10 points lower, while June operations are expected to be still lower, though inventories will be pretty well down by that time.

Consumers are engaged in inventory liquidation in most steel products, now that steel is easy to get.

It's thought that sales to the auto industry will be slow the next couple of months; an upturn in demand is not expected to develop until July when carmakers start rebuilding their raw material inventories for the 1961 model runs.

Distributors . . .

Prices, Page 154

Business at steel service centers has leveled off at about 62 per cent of the peak November-January volume. Sales dipped sharply in mid-February as customers completed the replenishment of their strike depleted stocks. Then bookings stabilized. April sales are holding at the March level, 5 to 10 per cent larger than those for the like 1959 months.

Although a sales manager describes business as "tolerable," he concedes that there are no signs of a pickup. Alloy plates are in good demand, but the carbon grades lack active buying interest. Standard structurals and wide flange beams are among the weakest of the major products. It's hoped they will have a seasonal revival.

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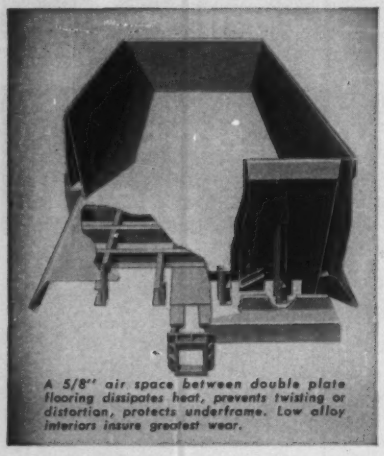

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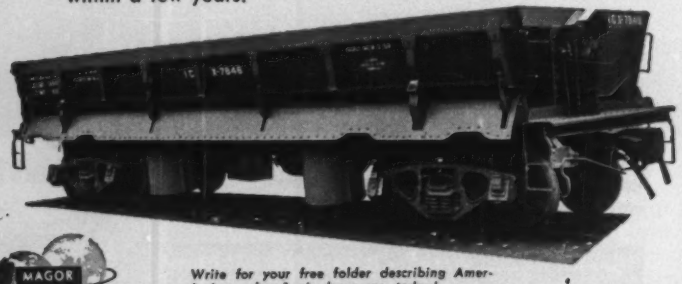

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construction weather has returned, shipments from service centers are increasing. One industry spokesman says sales are up an average of 10 per cent since Apr. 1. A more competitive price situation is also a factor behind the business improvement. Leading service center officials decided early this month to trim prices to compete more favorably with suppliers of imported steel products.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 150

Some manufacturers of industrial fasteners report a slight upturn in sales the last week or so. However, the pickup is not sufficiently strong, or of sufficient duration, to be regarded as indicative of a trend. Sales are running behind volume in the corresponding period a year ago.

To some extent, adverse weather conditions this spring caused the recent sluggishness, but it's not yet certain that a substantial sales recovery will accompany the improved weather, especially in those lines dependent on automotive requirements.

Plates . . .

Plate Prices, Page 147

Pipemakers are the only important plate consumers who are buying actively. Their sales have picked up in the wake of a recent decision by the Canadian government authorizing the export of natural gas, thus clearing the way for several big pipeline projects.

Warehouses have rebuilt their plate inventories and are buying only specialties, such as alloys, which have relatively long lead-times. Tank work remains depressed, and shipbuilding suffers from strikes at East Coast yards. Demand from machinery builders and freight car manufacturers hasn't come up to expectations so far this year.

Adding to the woes of the platemakers is continued stiff competition from foreign mills. They're landing substantial tonnages on the East Coast, shipping inland as far west as Detroit and Chicago, where they undersell domestic producers by a wide margin.

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delivery basis. Most suppliers are offering May delivery of sheared and universal plates. A major producer is operating at about 80 per cent of capacity, but with its backlog nearly exhausted, it's resigned to smaller output next month. No improvement in demand is expected before June or July.

Wire . . .

Wire Prices, Pages 149 & 150

Better weather is expected to bring out a larger volume of wire demand. Wiremakers' shipments in March fell below the year ago level. The drop resulted in some curtailment of production, and it's said there will be further operating cuts unless order volume improves soon.

Manufacturers' wire has been hit hard by cutbacks in the automotive, appliance, farm implement, and fastener industries. Adverse weather conditions this spring resulted in slack demand for the merchant wire products, including farm fencing. Construction wire items also have been moving more slowly than had been expected.

Steel distributors hold substantial supplies of merchant wire products, and until this inventory is moved, it's not likely there'll be much additional buying on warehouse account.

Tubular Goods . . .

Tubular Goods Prices, Page 153

April will be the last month for full production of tubular specialties until the autobuilders, boiler manufacturers, and utilities return to the market with large orders. Those consumers had no trouble rebuilding their inventories after the steel strike because suppliers with about 35 per cent of the industry's capacity had'nt been affected by the work stoppage.

Sales of mechanical and pressure tubing have declined steadily since the first of this year. Autobuilders started cutting back and canceling orders during February. It's believed that they have enough tubing in stock and on order to complete their 1960 model runs.

Pressure tubing producers attribute the lack of demand from the utilities to the traditional buying cycle, which is probably at a five year low point. There are hopes for an upturn in the fourth quarter.

Demand from the oil tool industry is poor—as might be expected from the low drilling rate. No pickup is in sight. A discouraging factor for the oil country goods makers is the continued low level of activity in the oil industry, particularly in Texas. The Texas Railroad Commission reported that May demand for oil will decrease 62,653 barrels compared with April.

Oilfield drilling appears to be moving ahead with the advent of more favorable weather. Hughes Tool Co. reported 1800 rotary rigs operating during the week ended Apr. 11, a 54-rig gain from the preceding week. A year ago the count was 2057.

Demand for cast iron pipe is picking up seasonally. Mill deliveries are prompt, and second quarter volume is expected to be satisfactory.

An 85 mile petroleum products line (6 in.) in Montana involves unstated tonnage. In Alaska, a 20 mile, 8 in., crude oil line is proposed. Pipe tonnage is unstated.

Semifinished Steel . . .

Semifinished Prices, Page 147

Steelmaking operations registered a slight upturn last week. The national ingot rate advanced 2.8 points from the week preceding to 80.9 per cent of capacity. Increases in production were reported at Pittsburgh, Detroit, St. Louis, in the South, the West, the Northeast, and Chicago. Declines were registered at Buffalo, Youngstown, Cleveland, and Cincinnati.

Considering the decline in demand pressure over recent weeks, the ingot rate is holding up surprisingly well. However, the down-

Steel Shipments by Markets—February, 1960

(Net tons)

Markets:	February 1960	February 1959	First Two Months 1960	First Two Months 1959
Converting, etc.	345,046	258,233	739,477	512,233
Forgings (except auto)	107,804	84,674	224,405	169,529
Fasteners	134,789	111,283	280,169	209,556
Warehouses:				
Oil & gas	132,176	161,630	311,803	309,626
All other	1,260,978	1,000,212	2,680,105	1,922,618
Total warehouse	1,393,154	1,161,842	2,991,908	2,232,244
Construction:				
Rail transport	6,189	4,269	14,131	8,989
Oil & gas	177,410	183,542	392,688	381,627
All other	695,597	582,016	1,478,318	1,123,052
Total construction	879,196	769,827	1,885,137	1,513,668
Contractors' products	369,912	349,113	792,323	672,191
Automotive:				
Cars, trucks, parts	1,686,737	1,451,174	3,501,800	2,871,505
Forgings	52,814	43,266	114,643	81,670
Total automotive	1,739,551	1,494,440	3,616,443	2,953,175
Rail Transportation:				
Rails, track, etc.	87,124	97,248	196,647	164,175
Cars, locomotives	224,862	147,479	455,166	249,647
Transit systems	3,228	2,006	6,267	4,022
Total railroad	315,214	246,733	658,080	417,844
Shipbuilding	61,198	82,900	138,505	151,156
Aircraft	8,395	5,185	17,465	9,809
Oil & gas drilling	60,523	52,515	123,788	101,458
Mining, quarrying, etc.	27,088	21,431	61,526	38,295
Agricultural:				
Machinery	99,130	92,223	209,621	198,912
All other	23,869	26,060	55,260	48,164
Total agricultural	122,999	118,283	264,881	247,076
Machinery, tools, etc.	449,962	408,955	950,606	790,792
Electrical machinery, etc.	223,821	195,439	466,264	385,617
Appliances, etc.	203,364	180,442	410,534	365,564
Other equipment	180,756	185,787	383,654	367,769
Containers:				
Cans & closures	447,161	447,006	952,756	865,236
Barrels, drums, etc.	90,383	69,916	192,323	143,740
All other	63,122	54,221	129,733	104,619
Total containers	600,666	571,143	1,274,812	1,113,595
Ordnance, military	11,682	13,204	25,442	26,272
Nonclassified	194,694	62,359	394,773	127,671
Total domestic shipments	7,429,814	6,373,788	15,700,192	12,406,219
Exports	153,219	150,586	302,344	304,274
Total shipments	7,583,033	6,524,374	16,002,536	12,710,493

Data from American Iron & Steel Institute.

trend in operations is expected to continue.

In the Buffalo area, the ingot rate has fallen to the lowest point since November when the steel strike ended. Despite the cutback in operations there, the layoff of workers has been held to a minimum. At Bethlehem's plant, for example, layoffs have been avoided by shifting affected men to other jobs. The vacation period started Apr. 15 at that works, and vacation schedules will absorb some of the men affected by production curtailments.

The reason for the slackening production isn't difficult to find. Steel users simply aren't carrying out the manufacturing schedules they originally projected for the first half. A good example is provided by the auto industry. Also, adverse weather this spring held back many construction projects. As a result, inventories have climbed faster than had been expected.

Generally, it's thought there won't be any upturn in demand for steel until after the start of third quarter. By that time, it's said, consumer inventories should be fairly well liquidated, and manufacturers should begin ordering for their late 1960 programs.

Steel Rate Averages 93.4 Per Cent in 1st. Quarter

The nation's steelmaking furnaces poured 11,563,000 net tons of ingots and steel for castings in March, up from the 11,126,806 tons poured in February, but down from the 12,049,404 tons produced in January, the first 12-million-ton month. In March, 1959, output was 11,567,745 tons, the record for that month.

The institute's index of steelmaking in March slipped to 162.5 in terms of the basic index (average production 1947-49). That compared with 167.2 in February and 162.2 in March a year ago. Operations averaged 91.6 per cent in the month vs. 94.3 in February.

As reported in STEEL (Apr. 18, p. 81), production in the first quarter was record breaking at 34,739,210 net tons. It topped by 949,000 tons the previous peak, 33,790,135, set in the second quarter last year. It was 4.2 million tons above the total for the first quarter, 1959 (30,488,068 tons).

The steelmaking index for the first quarter was 166.4 vs. 147.6 in the same period last year. Operations in the three months averaged 93.8 per cent vs. 83.8 a year ago.

Steel Ingot Production—March, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	95.5
*February ..	9,715,527	216,263	245,458	949,558	11,126,806	94.3
†March	10,106,000	203,000	307,000	947,000	11,563,000	91.6
†1st Qtr. ..	30,332,143	630,395	833,439	2,943,233	34,739,210	93.8
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ...	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr. ...	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr. ...	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo. ..	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September ..	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr. ...	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November ..	6,290,659	92,361	129,794	754,793	7,267,607	59.9
December ..	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
4th Qtr. ...	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
2nd 6 Mo. ..	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

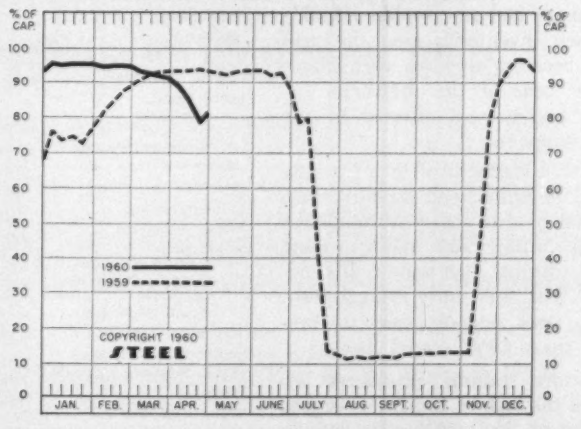
DISTRICT INGOT RATES

(Percentage of capacity utilized)

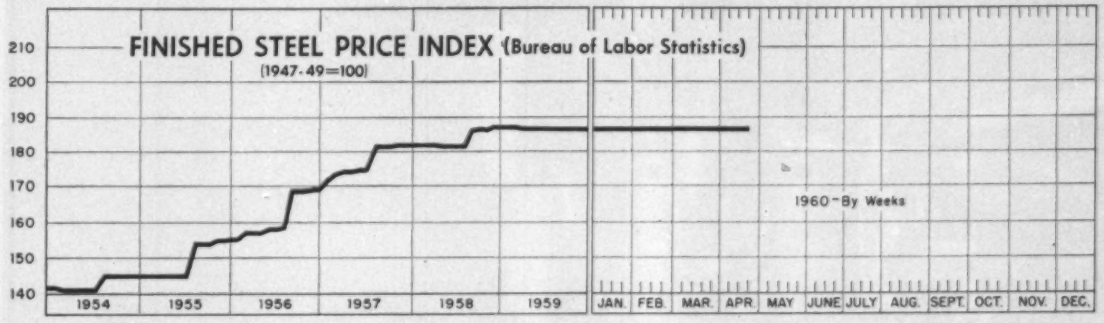
	Week Ended Apr. 24	Week Ago	Month Ago	Year Ago
Northeastern	81	79	86	96
Buffalo	86	88	103	97
Pittsburgh	81	79	90	94
Youngstown	63	64	81	87
Cleveland	88	90	103	94
Detroit	89	52	105	101
Chicago	87	86	97	92
Cincinnati	95	100	103	89
St. Louis	93	85	96	109
Southern	80	76	89	92
Western	76	72	76	95
Total Industry ..	80.9	78.1	91.1	93.5
Index ..... (1947-49=100)	143.5	138.5	161.7	164.7
Net Tons ..... (In thousands)	2,305	2,225	2,597	2,646

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Apr. 19, 1960	Week Ago	Month Ago	Mar. Index	Year Ago
186.8	186.8	186.8	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.060
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	Apr. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.40
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	33.66	33.66	34.00	34.67	36.08

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadephia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

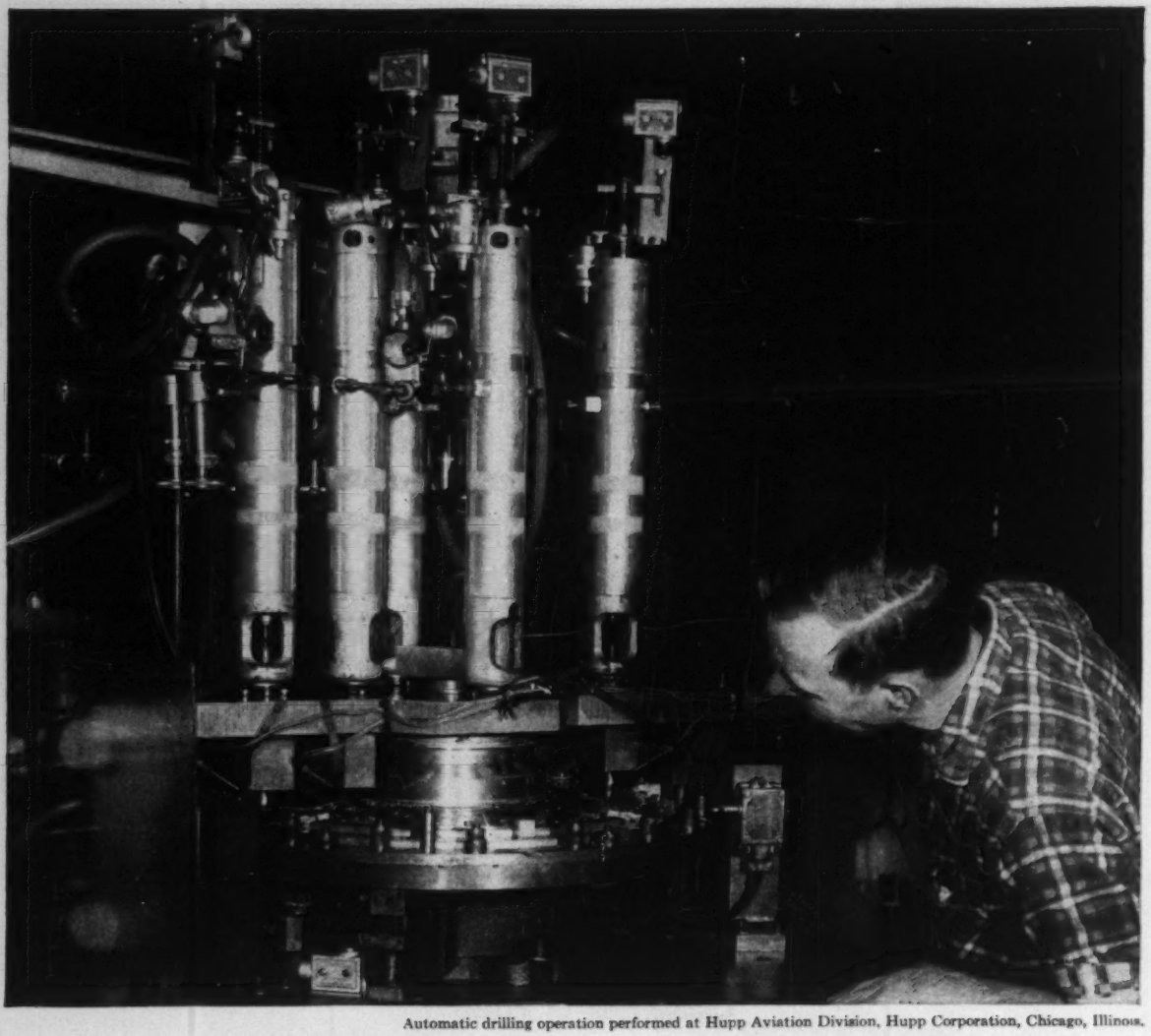
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 7/32-5/8" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Apr. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$34.50	$36.50	$35.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	36.00	33.50	37.75
No. 1 Heavy Melt, Chicago	31.50	31.50	31.50	34.00	35.00
No. 1 Heavy Melt, Valley	36.50	36.50	36.50	37.50	35.50
No. 1 Heavy Melt, Cleve.	33.50	33.50	33.50	35.00	33.50
No. 1 Heavy Melt, Buffalo	30.50	30.50	31.50	34.50	32.50
Rails, Rerolling, Chicago	53.50	53.50	53.50	57.50	52.50
No. 1 Cast, Chicago	45.50	45.50	45.50	44.50	41.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25



Automatic drilling operation performed at Hupp Aviation Division, Hupp Corporation, Chicago, Illinois.

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Steel Prices

Mill prices as reported to STEEL, Apr. 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 148, footnotes, page 150.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5.....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2.....99.50
Lackawanna,N.Y. B2...99.50
LosAngeles B3.....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3.....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7.....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2.....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5....122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2....6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 .....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 .....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2...6.50
Sterling,Ill.(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7.....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2....5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 .....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 .....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 .....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 .....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2.....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2....8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ....8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ....5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2....6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5....6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2....5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10....5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1....6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2....5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 .....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1.....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14...5.30
SparrowsPoint,Md. B2...5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10.....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2...7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5.....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14.....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1...8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y-1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2...7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2...7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3...6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5.....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10...5.55
Ashland l.c.l. (15) A10..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2....5.675
Aliquippa,Pa. (9) J5....5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ....5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ....5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1...6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburgh,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2.....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5.....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2.....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. (9) B2..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5.....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30....11.75*
Alloy
Ambridge,Pa. W18....10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles (49) S30....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4...7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14.....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32...9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2...9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 .....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ...9.325
Youngstown Y3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2. .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ...7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.825
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.16
Los Angeles (25) B3	5.85
Los Angeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
San Francisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago, Ill. W14	5.10
S. San Francisco (25) B3	5.85
Sparrows Point, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W. Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
Kansas City, Mo. S5	8.65
Los Angeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
Los Angeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. San Francisco (25) B3	8.325
Sparrows Point, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W. Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W. Va. W10	7.425
Fontana, Calif. K1	9.20
Franklin Park, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
Los Angeles C1, S41	9.30
McKeesport, Pa. E10	7.525
New Bedford, Mass. R10	7.875
New Britain, Conn. S15	7.875
New Castle, Pa. B4, E5	7.425
New Haven, Conn. D2	7.875
New Kensington, Pa. A6	7.425
Pawtucket, R.I. R3	7.975
Pawtucket, R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Wallingford, Conn. W2	7.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
Franklin Park, Ill. T6	15.55
Harrison, N.J. S18	15.55
Indianapolis S41	15.70
Los Angeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80
Weirton, W. Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	8.175

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
Franklin Park, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	....
Los Angeles S41	11.15	12.60	14.80	....	....
New Britain, Conn. S15	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
New Haven, Conn. D2	9.40	10.70	12.90	15.90	....
New Kensington, Pa. A6	9.85	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

			0.80C	1.05C	1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria, O. S1	...	...	19.05	22.15	....
Franklin Park, Ill. T6	...	...	19.20	23.30	28.15
Harrison, N.J. C18	...	...	18.85	22.95	27.80
New York W3	...	...	18.85	22.95	27.80
Palmer, Mass. W12	...	...	18.85	....	....
Trenton, N.J. R5	...	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
Granite City, Ill. G4	9.20	9.45	9.60
Indiana Harbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
Sparrows Point, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
Indiana Harbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
Granite City, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
Sparrows Point, Md. B2	8.20
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
Granite City, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
Granite City, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
Indiana Harbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
Beech Bottom, W. Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
Kansas City, Mo. S5	8.25
Kokomo, Ind. C16	8.10
Los Angeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. San Francisco C10	8.95
Sparrows Point, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
Kansas City, Mo. U3	12.90
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
New Haven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O. P12	12.65
Roebling, N.J. R5	12.95
Sparrows Pt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
Kansas City, Mo. S5, U3	10.00
Kokomo, Ind. C16	9.85
Los Angeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
New Haven, Conn. A7	10.05
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. San Francisco C10	10.70
Sparrows Pt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
Kansas City, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C16	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. San Francisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
Kansas City, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
Sparrows Pt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

	Col.
Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9 49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‡
Atlanta A11	198‡
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPt.,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‡
Atlanta A11	192‡
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	152
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage);	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325‡
Atlanta(48) A11	9.10	9.775‡
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.65†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‡
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625‡
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35‡
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‡
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. ‡10c. ‡‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¼ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

1/8 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard			Tee Rails
Rails	No. 1	No. 2	All No. 2	60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

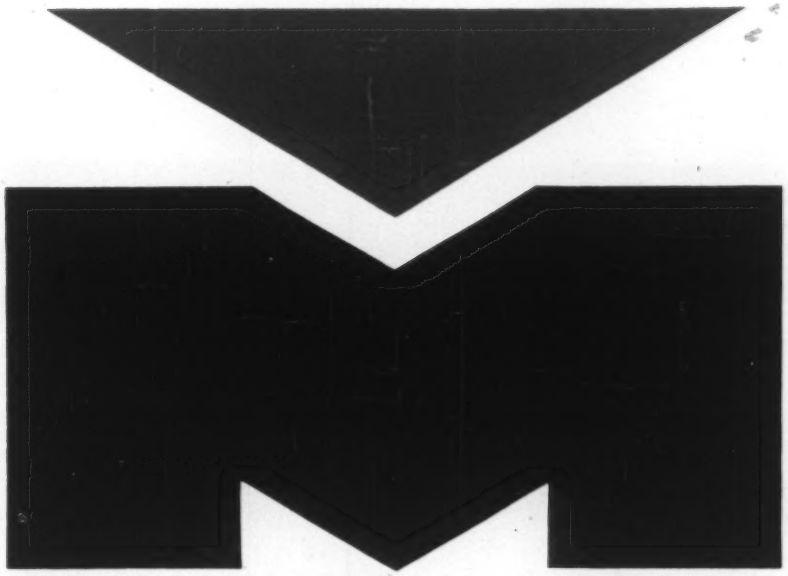
Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

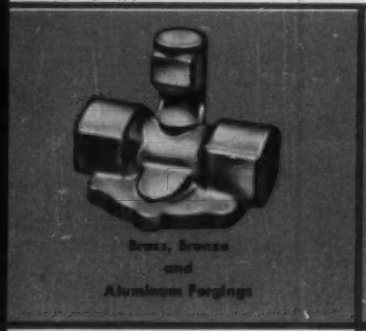
(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.



MUELLER BRASS CO.

A NEW SYMBOL FOR ALL THESE QUALITY PRODUCTS from ONE dependable source

THIS DISTINCTIVE corporate symbol is a new addition to the American business scene and represents the many diversified products made by the Mueller Brass Co. of Port Huron, Michigan, and its subsidiaries. It is a symbol of quality and service and identifies Mueller Brass Co. and its subsidiaries as a dependable source for copper, brass, aluminum and plastic products. Because of its diversified manufacturing facilities that encompass a wide range of fabricating methods, Mueller Brass Co. is in the unique position of being able to offer you, the purchaser, an intelligent, unbiased analysis of the best, most economical method by which your particular part can be produced. For sound design engineering, quality-controlled production and reliable delivery of fabricated parts, make Mueller Brass Co. your one dependable source for all these products . . .

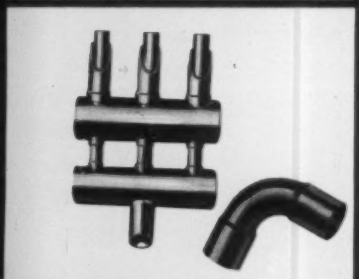


Brass, Bronze and Aluminum Forgings

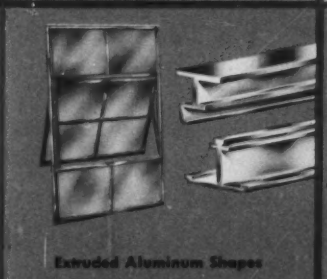
Copper base alloys in regular and special extruded shapes . . . standard or special alloys

Screw Machine Products

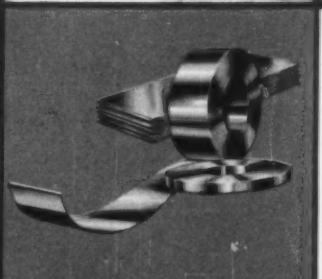
Cold-Prest Impact Extrusions



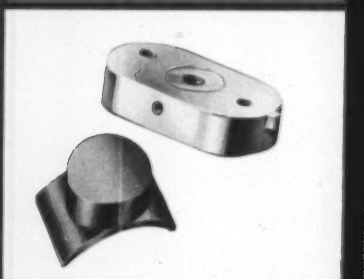
Formed Copper Tubing



Extruded Aluminum Shapes
Vampco Curtain-Wall, Windows and Doors



Aluminum Sheet, Coil and Strip

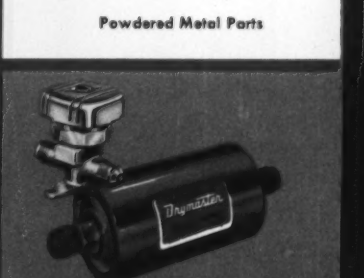


Powdered Metal Parts

Plastic Pipe, Injection Moldings and Custom Extruded Shapes

Non-Ferrous Castings

Streamline Solder-Type Fittings, Copper Tube and Valves For The Plumbing and Heating Industries



Valves, Driers, Fittings and Accessories for the Refrigeration and Air-Conditioning Industries.

MUELLER
BRASS CO.

MUELLER BRASS CO., PORT HURON, MICHIGAN

SUBSIDIARIES: VALLEY METAL PRODUCTS COMPANY, PLAINWELL, MICHIGAN; SHEET ALUMINUM CORPORATION, JACKSON, MICHIGAN; VAMPCO ALUMINUM PRODUCTS, LTD., STRATHROY, ONTARIO, CANADA

Litho in U.S.A.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		⅝		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp., American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.06	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.53	8.66	10.06	....	10.94	9.33	11.80	16.38	9.92	9.15	10.50
Birmingham	9.43	10.20	10.46	....	10.41	9.09	13.14	16.76	9.00	9.29	10.90
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	9.47	10.30	12.59	....	11.03	8.88	12.98	16.95	9.11	9.20	10.87
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.12	9.93	12.19	52.00	10.68	8.53	13.10	16.55	8.76	8.85	10.52
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.95	11.55	12.20	57.60	11.55	9.75	14.20	17.35	10.00	10.00	11.85
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.56	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	9.10	10.00	10.89	52.17	11.10	9.50	11.95	16.38	9.85	9.55	10.55
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.54	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.90	11.85	11.55	55.10	12.15	10.65	15.10	17.25	10.85	10.90	12.90
Seattle	11.55	12.30	12.50	56.52	12.65	11.10	16.20	17.80	11.20	11.00	13.10
Spokane, Wash.	11.55	12.30	12.50	57.38	13.15	11.60	16.20	17.80	11.20	11.00	13.60

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. x 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ¾ in.—2½ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Furber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, tins Ferry, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo contents, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails, 00	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0 f.o.b.
Unannealed (99+% Fe) (minus 325 mesh)	58.0 f.o.b.
Carbonyl Iron: 98.1-98.9%, 2 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l.	38.50; ton lots 40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.10-52.20†
Bronze, 500-lb lots	53.10-56.70†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.70-69.00†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-64.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.90	$5.95	$5.80	$5.65	$6.05
Bar Size Angles	5.95	6.00	5.85	5.75	6.10
Structural Angles	5.86	5.91	5.76	5.66	6.01
I-Beams	5.86	5.91	5.76	5.66	6.01
Channels	5.86	5.91	5.76	5.66	6.01
Plates (basic bessemer)	5.98	6.03	5.88	5.78	6.13
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft. ¾ x 0.30 lb per ft.	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.50	6.55	6.40	6.30	6.65
Merchant Bars	6.39	6.44	6.29	6.19	6.54
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (‡)	7.80	7.85	7.50	7.60	7.95

†Per 82 lb net reel. ‡Per 100-lb keg. 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Cariot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti-38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y. freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

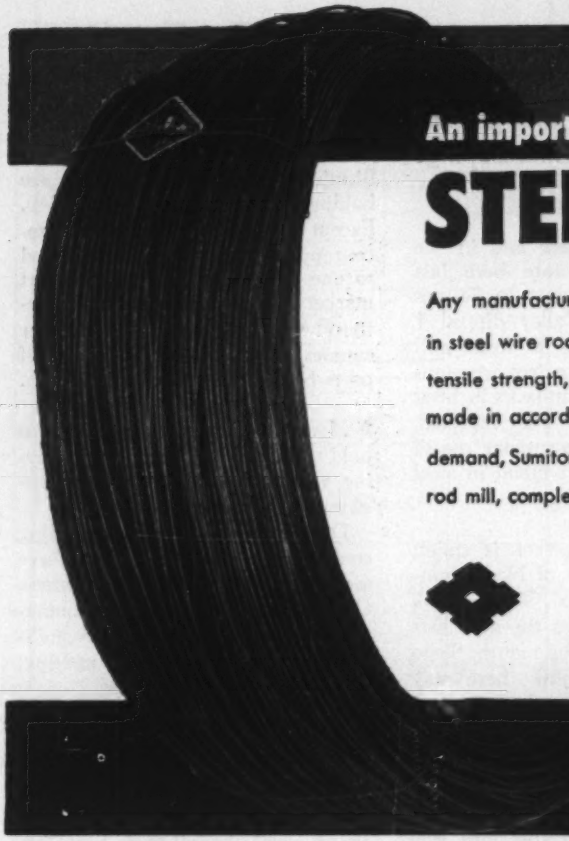
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



An important message for the man who buys

STEEL WIRE RODS

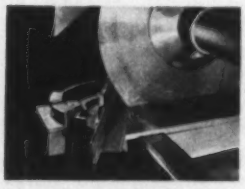
Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

NEW! PROMACUT multi-purpose cut-off saw



CUTS *without* CLAMPING or COOLANT

Cuts carbon, stainless and alloy steels in seconds

Just place stock on table; Promacut whizzes through 2″ x 2″ x ½″ mild steel angle in only 1 second; 6/10 second for ¾″ round. Smooth, almost burr-free cuts with comparable speed in many shapes and sizes: up to 12″ channel, 6″ I-Beams, 4″ angles. Does any job you're now doing with hacksaw, bandsaw, cut-off machine of equal capacity.

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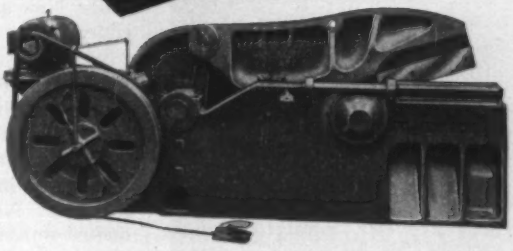
DEALERS: Some territories still open—write on letterhead.

"CANTON" Alligator Shears



For production cutting of bars, flats, rounds, angles, etc. Available with air operated stop motion clutch, hold down, length gauge and special grooved knives. "CANTON" shears are complete self contained units requiring no foundation. Low cost operation and minimum maintenance are proven features. Made in a complete range of sizes and models for every shearing need.

The HILL ACME Company
"CANTON" DIVISION 1201 West 65th St. CLEVELAND 2, OHIO

Bulletin S60 gives details.

Scrapmen Awaiting Market Turn

STEEL's composite on No. 1 heavy melting unchanged at $33.66 despite continued absence of substantial mill buying. Traders uncertain of immediate future trend

Scrap Prices, Page 160

• **Pittsburgh**—Prices of most grades are unchanged in a listless market. A major consumer bought small tonnages of secondary material, paying $27 for No. 2 bundles and $29 for No. 2 heavy melting scrap ($1 less than another mill paid recently). Turnings are hard to get, but also hard to sell. Some crushers are offering only $15 a ton for machine shop turnings; one of the few active buyers is paying $17 for carload lots. Brokers predict that No. 1 heavy melting scrap won't go below $32 or above $36 in the next few weeks.

• **Chicago** — The market is quiet. District mills are not buying dealer material, and prices are untested. With the area steelmaking rate averaging five to seven points below the month ago pace, the combination of returns of industrial scrap by mill customers under contract arrangement, yard inventories, and blast furnace hot metal are more than adequate to support melting operations. Disheartening to scrap dealers and brokers is the prospect that steelmaking activity will drop more before it gets better. Cast scrap continues in a rut too, with foundry operations still trending downward. Order backlogs for castings are narrowing to only a few days, making scheduling difficult.

• **Philadelphia** — Prices are unchanged throughout the list. There's barely enough trading to support the market. In borings and turnings, prices are purely nominal. Quotations on the major grades of steelmaking scrap are sustained principally by export demand.

• **New York** — Brokers' buying prices are steady, but there's not much buying to provide a thorough market test. Apart from foreign demand for the open hearth grades, not much material is moving.

• **Cleveland** — Steelmaking operations are slipping here and in the Valley. The ingot rate here last week declined 2 points to 88 per cent, and in the Valley dipped 1 point to 63. There is little mill buying of scrap, but prices are nominally unchanged. Cutbacks in blast furnace operations are expected. They could result in greater use of scrap in place of hot metal in steel melts.

• **Detroit** — The market is quiet; only small tonnages of No. 2 bundles are being moved. The outlook is for a price shift as the auto lists close at the end of the month. Some market observers think there may be a slight advance on the auto lists.

• **Buffalo**—A large local mill has held up incoming shipments of short shoveling turnings, indicating that less hot metal from the blast furnaces is needed by the open hearths. The mills here continue to take regular delivery of open hearth scrap, however, even though they have curtailed furnace operations.

Prices are holding, but in the absence of buying lack a test. The price picture is not likely to be clarified until the mills enter the market for their May requirements.

Cast iron scrap appears slightly softer. New orders reflect a price decline.

• **Cincinnati** — Only small, fill-in buying is being done to satisfy first-of-the-month mill orders. The cast grades continue easy, but prices are unchanged in the absence of a buying test. No. 1 heavy melting is quoted unchanged at $31.50-$32.50.

• **St. Louis** — Prices are slipping, even though a trickle of buying is reported. The mills appear to be well supplied, and with ingot operations sliding, there's not likely to be much market activity. Prices are down $2 a ton on No. 1 bundles and No. 1 busheling, clean auto cast, rerolling rails, and random length rails. They are off $3 on rails, 18 in. and under.

• **Birmingham** — The only major sale of scrap in this area last week involved a tonnage of No. 1 wheels. The price went up $2 a ton. A Holt, Ala., cast iron pipe manufacturer paid $50 for No. 1 cast scrap, but Birmingham manufacturers are holding their prices steady at $49. Except for the mentioned sales, recent purchases have been confined to one or two carloads. The export market is showing a little more activity; vessels are due to arrive for cargoes at South Atlantic and Gulf ports before the end of this month.

• **Houston**—Prices are expected to hold through May. Careful mill buying will probably prevent any upswing in the market.

Developments in export trading could upset predictions, but there seems little chance of higher prices. Current Western Gulf export quotations are: $35 for No. 1 heavy melting; $31 for No. 2 heavy melting; and $21 for No. 2 bundles.

Mexican mill buying in western Texas and the Rio Grande Valley is widespread, but buyers are seeking bargain prices.

The Texas cast iron market continues weak, though some East Texas foundries are showing more interest in purchasing material.

• **San Francisco** — There is little pressure for a price markdown on steel scrap here, but no buying is being done by the mills. Exports are about the only market supporting factor.

• **Seattle**—Prices at Portland, Oreg., and Seattle are unchanged, but weakening of the market is anticipated. Leading consumers have ample inventories and are not buying in volume. No export interest is reported. Yard receipts are small.

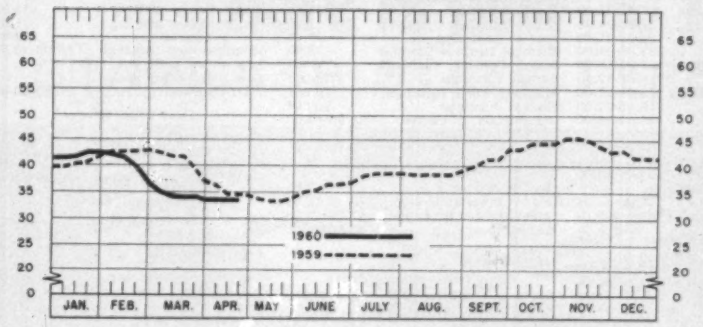
Scrap Consumption Down, Stocks Up in February

Consumption of purchased scrap in February (2,714,000 gross tons), was down slightly from the 2,793,000 tons used in January but was up from the 2,323,000 tons consumed in February, 1959, reports the Institute of Scrap Iron & Steel Inc. The February drop was due to the shorter month and a decline in daily use.

Total home and purchased scrap

STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



Apr. 20 1960	Week Ago	Month Ago	Year Ago	Mar. Avg.
$33.66	$33.66	$34.00	$34.67	$33.99

consumption during the month was also off, amounting to 6,497,000 tons vs. 6,614,000 in January.

Stocks of scrap (home and purchased) continued to rise in February, amounting to 8,525,000 tons vs. 8,518,000 at the end of January.

Canadian Steel Output Increased During March

Steel ingot production in Canada during March totaled 585,632 net tons, up slightly from the 544,930 tons produced in February. In March, 1959, output was 470,518 tons.

For the three months ended Mar. 31, production was 1,692,504 tons vs. 1,358,902 in the like period last year.

Steel Drum Shipments in January Dip 19 Per Cent

The movement of steel shipping barrels and drums in January totaled 2,568,299 units, off 19 per cent from the December total, and 1 per cent from that in January, 1959, reports the U. S. Census Bureau. Shipments of 5,376,852 pails in the month were 15 per cent below the December volume, but 7 per cent above that in January, 1959.

Tool Steel . . .

Tool Steel Prices, Page 153

Ford Steel Co. has opened a tool steel warehouse at Cincinnati. It will distribute tool steels produced by Bethlehem Steel Co. and the Steel & Tube Div., Timken Roller Bearing Co.

Structural Shapes . . .

Structural Shape Prices, Page 147

Improved weather conditions are being counted upon to bring out a substantial volume of new structural work. A considerable number of jobs are on drawing boards, and others before the market should shortly be ready for placement. Steel is plentiful. Fabricators' inventories are substantial because of buying prior to last year's strike and heavy deliveries early this year, and mills are in position to give quick deliveries. Shipments of structurals are running five weeks and under.

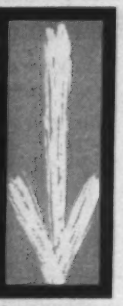
With the fabricating shops generally well fixed for steel, it's not likely they'll be pressing much new tonnage on the market. However, in contrast to plates, wide flange beams are reported in fairly brisk demand, and with the return of good weather, the wide flange mills think they'll have good business through June, with mill operations close to capacity.

In standard structurals, however, it's a different story: Producers need all the business they can get. Prospects for improvement hinge mainly on railroad carbuilding programs, which have been disappointing. The best that can be said for the standard structural market is that sales are no longer declining; the downtrend that started in January is apparently arrested.

Current jobs are relatively small,

(*Please turn to Page* 165)

INCOME TAXES are going DOWN



for everybody in MISSISSIPPI

- Executives will weigh this mandatory tax reduction program in their future plans.
- Top Income Tax bracket will be reduced 50%, graduated over a six-year period.
- Personal Exemptions are increased $1,000; individuals now $5,000, married couples $7,000.
- Main Street merchants view tax reduction as a very real incentive to industrialization.

For Further Information Contact
MISSISSIPPI AGRICULTURAL AND INDUSTRIAL BOARD
Jackson, Mississippi

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Apr. 20, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 20	$33.66
Apr. 13	33.66
Mar. Avg.	33.99
Apr. 1959	34.96
Apr. 1955	36.73

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	*28.00-29.00*
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	26.00-27.00
No. 1 busheling	34.00-35.00
No. 1 factory bundles	41.00-42.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*16.00-17.00*
Short turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Cut structurals:	
2 ft and under	42.00-43.00
3 ft and under	41.00-42.00
Heavy turnings	31.00-32.00
Punchings & plate scrap	45.00-46.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 2 ft and under	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Random rails	52.00-53.00
Angles, splice bars	46.00-47.00
Railroad specialties	47.00-48.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	220.00-225.00
18-8 turnings	120.00-125.00
430 bundles & solids	120.00-125.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	28.00-29.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	38.00-39.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	40.00-41.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	52.00-53.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Angles, splice bars	45.00-46.00
Axles	51.00-52.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	17.00-18.00
No. 1 bundles	31.00-32.00
No. 2 bundles	15.00-16.00
No. 1 busheling	28.00-29.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	10.00-11.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Heavy breakable	34.00-35.00
Unstripped motor blocks	26.00-27.00
Charging box cast	34.00-35.00
Clean auto cast	47.00-48.00

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	24.00-25.00
No. 1 factory bundles	37.00-38.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	33.00-34.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	35.00-36.00
Cut structurals, plate 2 ft and under	43.00-44.00
Low phos. punchings & plate	34.00-35.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Charging box cast	33.00-34.00
Heavy breakable cast	35.00-36.00
Stove plate	44.00-45.00
Unstripped motor blocks	35.00-36.00
Brake shoes	35.00-36.00
Clean auto cast	52.00-53.00
Burnt cast	42.00-43.00
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	49.00-50.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00
Cast steel	42.00-43.00
No. 1 railroad cast	52.00-53.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	60.00-61.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	105.00-110.00
430 clips, bundles, solids	110.00-115.00
430 turnings	35.00-45.00

YOUNGSTOWN

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	27.00-28.00
No. 1 busheling	36.00-37.00
No. 1 bundles	36.00-37.00
No. 2 bundles	23.00-24.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	37.00-38.00
Electric furnace bundles	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	23.00-24.00
No. 1 busheling	30.00-31.00
Shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.50-32.50
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.50-32.50
No. 2 bundles	21.00-22.00
No. 1 busheling	31.50-32.50
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos. 18 in.	42.00-43.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Heavy breakable cast	36.00-37.00
Charging box cast	38.00-39.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	48.00-49.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	22.00
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	19.00†
Shovel turnings	23.00†
Machine shop turnings	19.00†
Heavy turnings	29.00†
Structurals & plates	38.00-41.00
Couplers, springs, wheels	44.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Drop broken machinery	51.00-52.00
Malleable	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	8.00-9.00†
Mixed borings, turnings	9.00-10.00
Shovel turnings	12.00-13.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	185.00-190.00
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	75.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	6.00-7.00
Shovel turnings	11.00-12.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	*20.00-21.00*
No. 1 busheling	35.00-36.00
Cast iron borings	12.00-13.00
Machine shop turnings	21.00-22.00
Shovel turnings	22.00-23.00
Bar crops and plate	41.00-42.00
Structurals & plate	40.00-41.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	48.00-49.00
Charging box cast	29.00-30.00
Unstripped motor blocks	38.00-39.00
No. 1 wheels	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	50.00-51.00
Rails, random lengths	45.00-46.00
Angles, splice bars	42.00-43.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	*33.00*
No. 2 bundles	21.50
No. 1 busheling	*33.00*
Machine shop turnings	*15.00*
Shovel turnings	*17.00*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00†
Heavy breakable cast	40.00†
Unstripped motor blocks	39.00†
Clean auto cast	*48.00*
Stove plate	*46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	35.00
Rails, 18 in. and under	46.00†
Rails, random lengths	*43.00*
Rails, rerolling	*54.00*
Angles, splice bars	44.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Low phos. plate & Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	30.00
No. 2 bundles	17.00
Machine shop turnings	16.00
Shovel turnings	16.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	24.00
Shovel turnings	16.00
Electric furnace bundles	43.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable	26.00
Unstripped motor blocks	24.00
Stove plate	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	32.00
No. 2 heavy melting	28.00
No. 1 bundles	28.00
No. 2 bundles	23.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1	42.00

Cast Iron Grades

No. 1 cupola	30.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

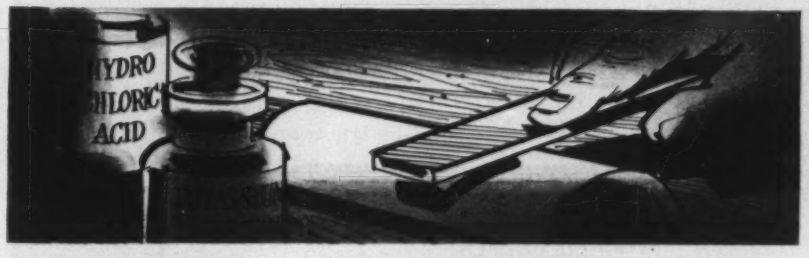
No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.

S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE

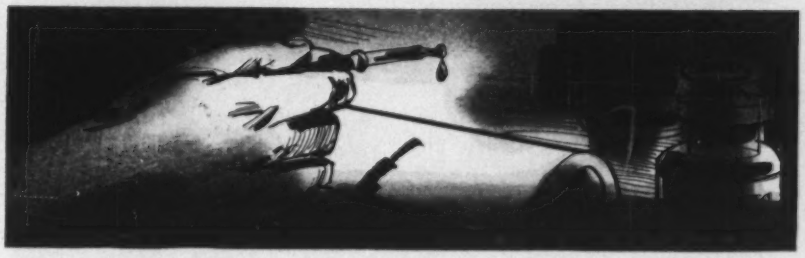
Here is how to test for

STAINLESS STEEL TYPES 309 and 310



Rub specimen with file to obtain clean surface. Add 1 drop of 10% hydrochloric acid and let react for 1 minute. Add 1 drop of 10% potassium ferricyanide solution. After 30 seconds, if dark green or blue color appears, sample belongs to iron alloy group.

Add concentrated sulphuric acid; if there is no reaction in a minute's time, follow with a drop of 1:1 nitric acid. If there is still no reaction try 1 drop of hydrochloric acid followed by a solution of 6% sulphurous acid. In 30 seconds if no black smudge appears, test for magnetic properties. If not magnetic, add 1 drop of 1:1 hydrochloric acid and after reaction period, add 1 drop of 10% potassium ferricyanide. If a white drop with a black edge appears, the specimen may be a very high nickel-chromium alloy or 309 or 310.



Add 1 drop of concentrated hydrochloric acid and 1 drop of acidified cupric chloride to a fresh surface. At the end of 1 minute, if there is a copper flash, the specimens are probably either 309 or 310.

Although they represent a limited tonnage in comparison to the production of other stainless and heat resisting steels, Types 309 and 310 have a special importance.

For those conditions which require scale resistance and special strength at elevated temperatures, either 309 or 310 with their high nickel and chromium content are most frequently chosen. They are used for heat exchangers, industrial furnace equipment, petrochemical installations, and more recently in the manufacture of jet propulsion motors.

For scrap of known analysis, our personnel, equipment, experience and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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IMPORT & EXPORT—LIVINGSTON & SOUTHARD, INC., Chrysler Building East, New York, N.Y. • 5950 S. Boyle Ave., Los Angeles 58, Cal. Cable Address: FORENTRACO

Plenty of Copper Around

Supply will be ample from here on out, barring disorders overseas. Prices will probably drop in the summer. Strong European demand buoying market

Nonferrous Metal Prices, Pages 164 & 165

COPPER has jumped from a position of strike-caused shortages to one of ample supply much faster than most metalmen had forecast.

● **Previous Records Crumble**—Behind the spurt is a record shattering performance in March and continued high level activity in April. Just look at what happened last month: Domestic primary facilities spewed out an all-time high 107,995 tons, up 22,000 tons from the preceding month. Refined production climbed 24,000 tons to 129,758 tons. Producers' stocks fell 3000 tons to 61,598 tons.

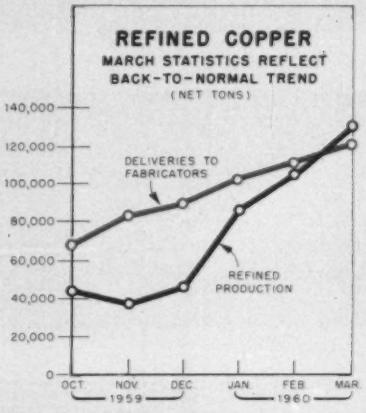
Not to be outdone by the U. S., Free World producers outside this country also knocked off all existing records in primary output as they turned out 199,784 tons. Refined production outside the U. S. rose to 172,195 tons.

● **Deliveries Rocket** — March also saw Free World fabricators take in 304,475 tons, the largest total in history. Deliveries in the U. S. hit 122,752 tons, the best month since last June, but the U. S. copper picture isn't quite as bright as the statistics make it seem.

Here's why: Business never has reached the levels hoped for after the strike and it doesn't look like things will improve much in the foreseeable future. Large fabricacators, particularly brass mills, have seen the Soaring Sixties dip, and it's feared a large part of the metal they're buying is going into inventory.

That means new orders from the mills will probably fizzle even more over the next few weeks unless consumers show a lot more activity (and no one is making predictions since the status of consumer inventories is a mystery not even the most astute market analyst has solved).

● **Europe Holds Up Market** — If things are slow in the U. S., the opposite it true in Europe. Booming demand there is holding up the world price and creating a market for substantial tonnages of U. S. copper. After paying freight and duty, a U. S. company can now lay down copper in Europe for 32.5 cents a pound, more than it could realize here after freight is paid.



Source: Copper Institute.

That market is holding back temporarily a large copper surplus on the world scene and causing price weakness and cutbacks in production. But the signs are in the air, and as metalmen have been predicting for months, we'll see a condition of overabundance before the year is out. Guessing right now pegs the time the condition will occur at around midsummer unless (and this is an important qualification) labor walkouts or political unrest in such large producing areas as South Africa and Chile cause shutdowns of major facilities.

Prices appear stable for at least the next few weeks and probably into the summer. You can look for lower prices then, provided African and Chilean workers don't walk out.

Primary production may be a little lower in the U. S. in April as ores accumulated during the strike are worked off. Refined production may go up some (though not much) as the industry feels the impact of resumption of production at Phelps Dodge Corp.'s Laurel Hill (N. Y.) refinery, which was strikebound until late March. U. S. stocks should begin to rise but this won't cause any early worries since they're only about half as high now as producers think they should be.

In the Markets

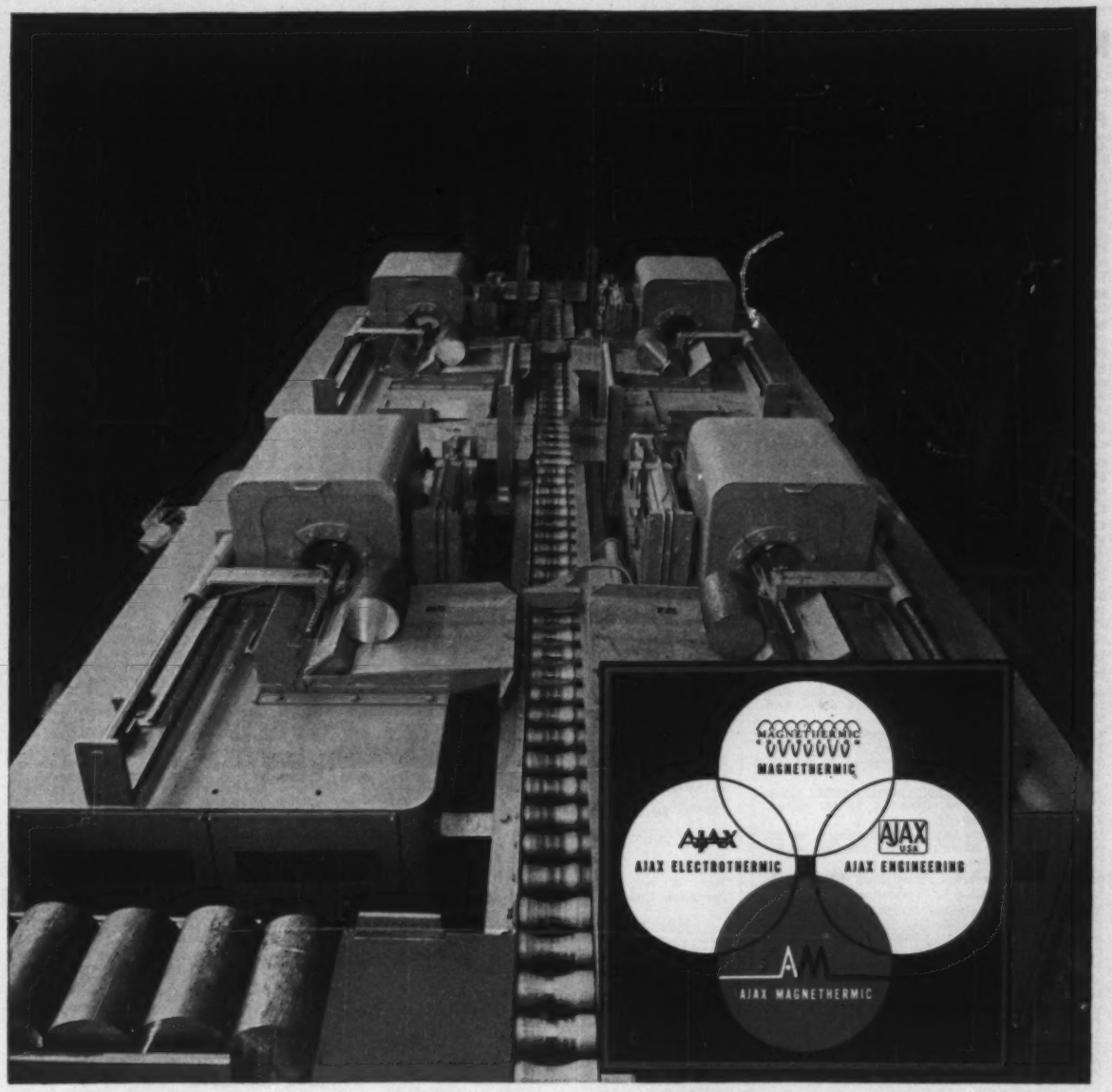
● **Lead Improves**—Customers are on a small buying spree after having virtually ignored the metal for many weeks. While still largely based on immediate needs, sales should be good through May, say metalmen.

● **Zinc Quiet** — Shipments this month will probably improve, but there has been no heavy wave of buying for some time. Producers hope for a May upswing.

NONFERROUS PRICE RECORD

	Apr. 20 Price	Last Change	Previous Price	Mar. Avg	Feb. Avg	Apr., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.296	34.000	32.404
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	10.992
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	98.875	Apr. 20, 1960	99.00	100.227	101.170	102.490
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.



At Scovill Manufacturing Company, Waterbury, Connecticut, these four Ajax Magnethermic Induction Heaters heat 9" x 16" copper and brass billets for a 2500 ton extrusion press at the rate of 60 billets per hour. Each heater is rated 450 KW. The four heaters in tandem are served by a common loading and unloading conveyor.

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60-Cycle Induction Billet Heaters manufactured by AM, one of our many products for induction heating or melting of all types of metals.

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Youngstown 1, Ohio

TRENTON DIVISION
930 Lower Ferry Road
Trenton 5, New Jersey

YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 98.875.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb., New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 25.50-25.75; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 27.75-28.75; 108 alloy, 25.25-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: A63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6063-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths: .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.25-23.50; No. 2 heavy copper and wire, 20.50-20.75; light copper, 18.00-18.25; No. 1 composition red brass, 16.00-16.50; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	28.875	28.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.00-15.50; new brass clippings, 14.50-15.00; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.25; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.00-9.50.

Monel: Clippings, 27.00-28.00; old sheets, 23.00-24.00; turnings, 20.00-22.00; rods, 27.00-28.00.

Nickel: Sheets and clips, 53.00-54.00; rolled anodes, 53.00-54.00; turnings, 41.00-42.00; rod ends, 53.00-54.00.

Zinc: Old zinc, 3.25-3.75; new diecast scrap, 4.00-4.50; old diecast scrap, 2.25-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.50-13.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.50-16.00; mixed low copper clips, 15.50-16.00; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.75-12.00; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.50-15.00; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.00-14.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.
Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.00; light copper, 22.00; refinery brass (60% copper) dry copper content, 22.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.00; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.25; yellow brass turnings, 14.00; radiators, 16.50.
(F.o.b. shipping point, freight allowed on quantities)

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (Anhydrous): 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90.

Stannous Sulphate: Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 159*)

with public work prominent in the picture—notably schools and highways. Estimating of bridge tonnage is heavier in New England, and there are a number of sizable bridge projects before the market on the West Coast. More public work is pending, but bid openings have been delayed in some cases by the weather. In Boston, bids on the proposed new state office building have been held up. This project will be matched by at least one federal office building. Also, in this category in the district, are structures for a New Haven, Conn., redevelopment project.

Fabricators continue to be plagued with stiff price competition. Structural steel, fabricated and erected, simply hasn't followed increases in labor costs. While some fabricators have sufficient orders in hand to assure active operations through the summer, the scramble for new work is as frantic as ever.

Inland Steel Co.'s 28 in. structural mill will be down about two weeks. Reason: New facilities will be integrated with the old in an expansion that will double the company's production capacity for wide flange beams. The company's ingot rate will fall 5 to 10 per cent during the period.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

579 tons, high tensile, amphibious transport dock, Navy Purchasing Office, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

536 tons, high school, Cumberland, R. I., to Providence Steel & Iron Co., Providence, R. I.; Donatelli Building Co. Inc., North Providence, R. I., general contractor; 70 tons of reinforcing bars went to the Plantations Steel Co., Providence.

375 tons, structurals and reinforcing, Catholic high school, West Hartford, Conn., to Berlin Construction Co., Berlin, Conn., structurals; to Sherer Steel Co., East Hartford, reinforcing bars; Anderson-Fairoaks Construction Co., Hartford, general contractor.

317 tons, state highway bridges, Reading-Wakefield, Mass., to West End Iron Works, Cambridge, Mass.; J. F. Fitzgerald, Canton, Mass., general contractor.

350 tons, structurals and reinforcing bars, South Catholic High School, Hartford, Conn., to Standard Structural Steel Co., Hartford (structurals), and Sherer Steel Co., East Hartford, Conn. (reinforcing); Wadhats & May, Hartford, general contractor.

300 tons, distribution center, Polaroid Corp., Needham, Mass., to West End Iron Works, Cambridge, Mass.; Vappi & Co. Inc., Cambridge, general contractor; reinforcing

150 tons, including bars, state highway bridge, Newport-Troy, Vt., to Vermont Structural Steel Co., Burlington, Vt.; Ralph Goodrich Inc., Burlington, general contractor.

STRUCTURAL STEEL PENDING

200 tons, trash racks, guides, etc., Mayfield powerhouse, Washington State; Bellingham Shipyards Co., Bellingham, Wash., low at $71,699 to Tacoma, Wash.

125 tons, altitude rocket test facility, fabrication, delivery, and erecting; bids Apr. 26, National Aeronautics & Space Administration, Lewis Research Center, Cleveland, Ohio.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2700 tons, highway structures, Shreveport Expressway, Caddo Parish, La., to Southwest Steel Co., New Orleans; Nichol-Southern Div., Yuba Consolidated Industries, Baton Rouge, La., general contractor.

500 tons or more, office building addition, Western & Southern Insurance Co., Cincinnati, to Pollak Steel Co., Cincinnati; Turner Construction Co., Cincinnati, general contractor.

475 tons, five state highway structures, Hingham-Rockland, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; J. G. White Contracting Co., Westwood, Mass., general contractor.

450 tons, health center, Harvard University, Radcliffe College, Cambridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Boston, general contractor.

PLATES . . .

PLATES PLACED

1108 tons, hull, General Stores Supply Office, Navy, Philadelphia, to the Colorado Fuel & Iron Corp., Claymont, Del.

720 tons, steel sheet piling, deep sea terminal construction, Port of Seattle, to unstated Belgian interest; General Construction Co., Seattle, general contractor.

540 tons, 30 tanks for Olympia Brewing Co., Tumwater, Wash., to Puget Sound Fabricators Inc., Seattle.

468 tons, General Stores Supply Office, Navy, Philadelphia, to the Colorado Fuel & Iron Corp., Wilmington, Del.

400 tons, five tanks, Texaco Corp., Westville.

CLASSIFIED

MARKET RESEARCH ANALYST

Industrial publication. Experience library and original research, knowledge of metal working industries required.

Please write details of age, education, experience and salary requirements.

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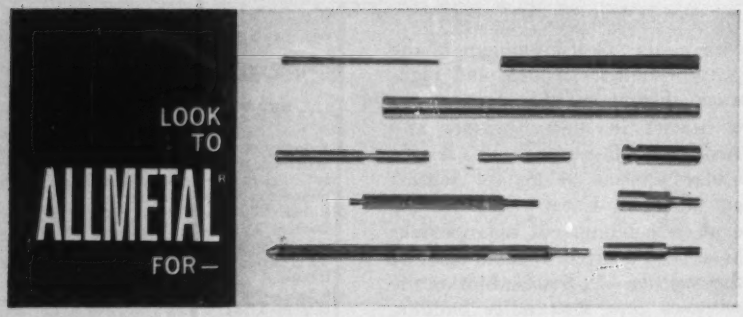

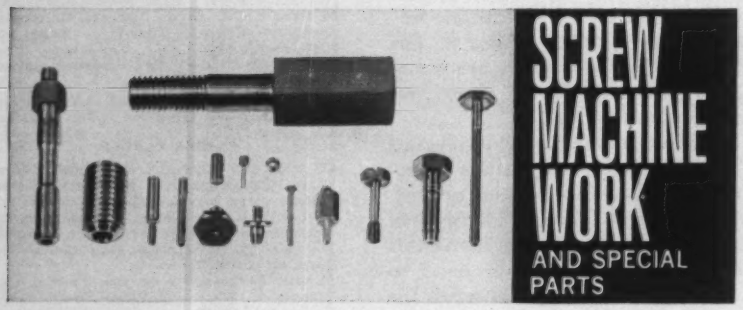

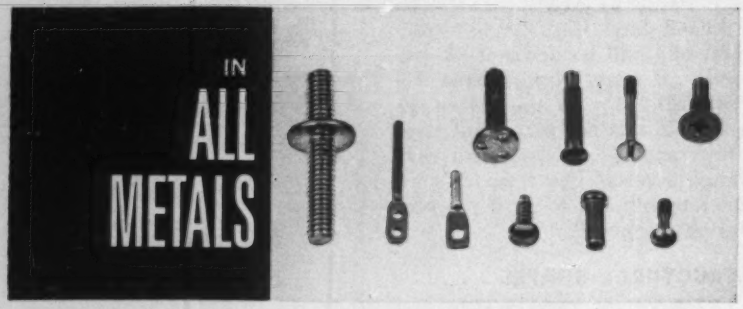

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N. J., to Chicago Bridge & Iron Co., Chicago.

386 tons, carbon, Navy, General Stores Supply Office, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

319 tons, carbon hull plates, Navy, General Stores Supply Office, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

300 tons, cargo containers for Alaska Steamship Co., Seattle, to Puget Sound Fabricators Inc., Seattle.

227 tons, Navy, General Stores Supply Office, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.; also, 205 tons of carbon steel sheets to U. S. Steel Corp., Pittsburgh.

258 tons, high tensile, Navy Purchasing Office, Washington, for the Brooklyn Navy Yard, to Lukens Steel Co., Coatesville, Pa.

225 tons, elevated water tank and reservoir, Woonsocket, R. I., to the Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 tons or more, dredge pontoons, to Commercial Steel Fabricators Inc., Seattle; by U. S. Engineer, Portland, Oreg.

200 tons or more, also shapes, 200 gondola cars for Union Pacific Railroad, to Gunderson Bros. Engineering Co., Portland, Oreg.

200 tons, elevated water tank, Medical Lake, Wash., to Chicago Bridge & Iron Co., by Washington State.

200 tons, elevated water tank, to Pittsburgh-Des Moines Steel Co., Seattle, by Montlake Terrace, Wash.

200 tons, water tank, Milton-Freewater, Oreg., to Graver Tank & Mfg. Co., Provo, Utah, division of Union Tank Car Co.

100 tons or more, high pressure air and gas storage, Langley Field, Va., to A. O. Smith Corp., Milwaukee, $896,000.

100 tons, elevated water tank, Ft. Riley, Kans., to Chicago Bridge & Iron Co., Chicago.

100 tons, water tank, Plaquemine, La., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, two additional digesters, Simpson Paper Co., Everett, Wash., to Chicago Bridge & Iron Co., Seattle.

100 tons, 100,000 gallon elevated water tank, King County District No. 53, Seattle, to Pittsburgh-Des Moines Steel Co., Seattle, low at $33,675.

100 tons, or more, plates and pipe, high pressure air and gas storage fields, Langley Field, Va., to A. O. Smith Corp., Milwaukee, $896,000.

PLATES PENDING

720 tons, sheet steel piling for Port of Seattle terminal project; General Construction Co., Seattle, general contractor.

400 tons, 18,000 feet, 20 to 30 in. water pipe, Port Angeles, Wash.; Harold Kaeser, Seattle, low at $31,100 for steel plate, $315,223 for concrete cylinder; R. W. Beck & Co., Seattle, engineer.

300 tons or more, 10,000 ft, 30 in. diameter water supply line, for Corvallis, Oreg.; American Pipe & Construction Co., Portland, Oreg., low at $113,104.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, twenty-five 2000 hp road switchers, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

Nickel Plate, fifteen 1800 hp diesel-electric locomotives, with ten going to Electro-Motive Div., General Motors Corp., La Grange, Ill., and five to Alco Products Inc., Schenectady, N. Y.

Texas & Pacific, five 1800 hp road switchers, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

Northern Pacific Railway, fifteen 1800-hp diesel road switchers, nine going to the Electro-Motive Div., General Motors Corp., La Grange, Ill., and six to Alco Products Inc., Schenectady, N. Y.

RAILROAD CARS PLACED

Chicago, Milwaukee, St. Paul & Pacific, 50 seventy-ton boxcars, to General American Transportation Corp., Chicago.

Norfolk & Western, 500 boxcars to Pullman-Standard Div., Pullman Inc., Chicago.

St. Louis-San Francisco, 400 fifty-ton boxcars to Pullman-Standard Div., Pullman Inc., Chicago.

Canadian National, fifty 3000-cu ft capacity covered hopper cars, to Marine Industries.

Clinchfield, twenty-five 50½ ft boxcars, to Pullman Standard Div., Pullman Inc.

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FROM .010" TO .0002" SOMERS IS No. 1 FOR STAINLESS STEEL THIN STRIP®

302,304,305,316,321,347,430 17-7PH, PH-15-7MO plus various high temperature alloys and rare metals are precision produced by Somers up to 25" wide in gauges as thin as .001", narrower widths to .0002".

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...when "tonnage is produced on a laboratory basis"—

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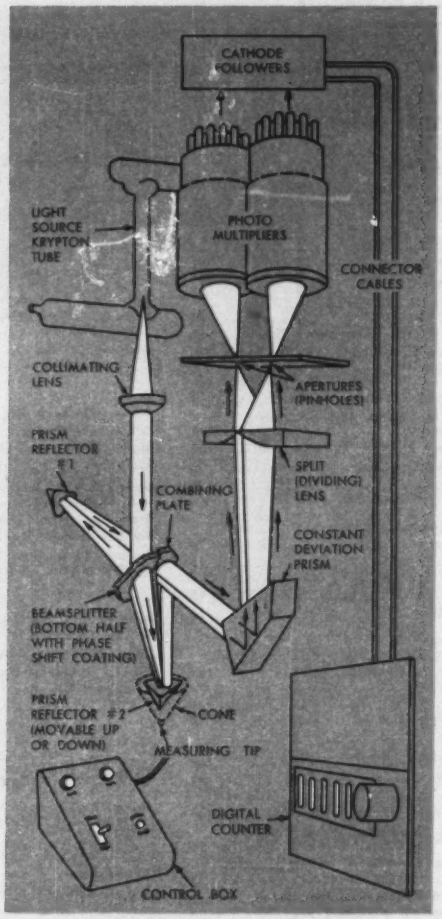
As the diagram at right shows, the movement of the measuring tip modulates the krypton light source and produces fringes which are detected and counted. This reading is then converted to thickness of the test piece. After measuring, the sample returns to the line; the gaging equipment is zeroed against the known thickness, and processing starts up again. By taking a sample from each coil, ***it is almost impossible to have an error caused by variation in density between different alloys.***



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Wean has designed and built galvanizing lines for a wide variety of customer requirements. Why not take advantage of Wean's *creative engineering* experience on your next coating line project.

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